September 1988 • The Naval Aviation Safety Review US NAVY

Melanie

approach

SONGBIRDS: "FLIGHT PHYSIOLOGY"

approach looks at aero medicine

Traditionally, the Navy flight surgeon's mission has been to maintain the health, safety and well-being of the aircrews. This is still true, but the flight surgeon (FS) also must keep abreast of the many changes in naval aviation.

The Role of Today's Flight Surgeon

By LCdr. J.C. Antonio, MC(FS)

BEFORE their first assignment, flight surgeons have completed medical school (usually four years), a one-year internship (though some are board-certified in a specialty) and the six-month flight surgeon school.

Changes in aircraft design and technology have brought about studies in such diverse areas as G-induced loss of consciousness (GLOC), temporal distortion, night vision and post-simulator vertigo. Advances in airborne technology, such as the use of infrared, lasers, night vision goggles, advanced radars and HUDs, have lengthened the mission profile in both time and physiological demand. Unfortunately, not all aspects of aircrew environment have kept pace with these other advances (e.g., helo chem suit with ANVIS goggles), which can in turn diminish the aircrews' ability to accomplish the mission.

The FS's areas of concentration largely depend on the billet he occupies. CAG FSs need to be familiar with night vision, infrared devices, laser weapons and their impact on the aircrew both from a physiological and a mission point of view. Marine Corps FSs also need to know about the chemical environment and how the aviation life support systems integrate with this new environment. RAG and training command FSs are in excellent positions to gather data that will help influence the directions that cockpit design and life support systems may take.

These are only brief examples of what FSs can do by becoming more operationally oriented and establishing closer ties to the aviation life support system groups and RDT&E groups (e.g., NADC, VX-5, HMX-1, NATC), and trying to stay at the forefront of changes that impact on the aircrew and mission.

With this in mind, how can today's FS find the time to learn this new material and begin applying it? By spending the majority of his time where he should — at the squadron.

The relationship between the clinic and local FSs varies widely, but occasionally it is an adversarial relationship that needs to be avoided by cooperation and education. Many clinics are not aware of what an FS's job really is, and a little formal education can do wonders. Also, by being flexible and helping when he can, an FS can earn the appreciation of the clinic. The FS's obligation to work at the clinic is two-fold. First, he needs to keep his clinical skills tuned. Second, he needs to offer his services to the clinic where his squadron utilizes the lab, X-ray, pharmacy, sick call and ER. The clinic, on the other hand, must realize to whom the FS belongs and should not include him in manning levels unless he is attached permanently to them.

Ideally, there should be an FS for each squadron. This would allow more aggressive, direct contact at the fleet level, and more meaningful input to the life support groups, R&D groups and T&E groups. Here are some general suggestions to help the FS get the most from his assignment:

- Work through the base Senior FS to ensure that you spend no more than one-half of your time doing clinical duties.
- Establish the most direct ties possible with the ALSS groups and offer direct "fleet feedback" to them as needed. When discussing flight gear problems, don't just repeat complaints but offer solutions and suggestions.
- Depending on the type of squadron or community to which you're attached, you should become the human factors expert on all weapon systems or mission scenarios that have an aeromedical involvement, such as NVG missions.
- Become more involved in operational planning done by the squadron and make all dets. ◄

LCdr. Antonio flew 100 combat missions in Vietnam as an A-7B pilot with VA-25. He served as an instructor in VT-9 and an A-4 pilot with the Naval Air Reserve. He has served as VF-101's flight surgeon and is currently assigned to VX-5, China Lake, Calif., as the squadron naval aviation research flight surgeon. He is qualified in the F/A-18A.

inside approach

Vol. 34 No. 3

Cover: Hank Caruso provided us with this whimsical look at the flight surgeon and his principal responsibility, monitoring pilot aeromedical status.

FEATURES

DEPARTMENTS

Approach is a monthly publication published by the Commander, Naval Safety Center. Address comments, contributions and questions about distribution and reprints to:

Commander, Naval Safety Center
NAS Norfolk, VA 23511-5796
Attention: Approach — Code 71

Telephone: Commercial 804-444-7416; Autovon 564-7416

ISSN 0570-4979. The contents should not be considered directives and may not be construed as incriminating under Art. 31 of the Uniform Code of Military Justice. Views expressed in guest-written articles are not necessarily those of the Naval Safety Center. The Secretary of the Navy has determined that this publication is necessary in the transaction of business required by law. It is funded and printed in accordance with all Navy publishing and printing regulations and approval of the Navy Publications and Printing Policy Committee. Second-class postage paid at Norfolk, Va., and additional mailing offices. Approach is available for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

POSTMASTER: Send address changes to APPROACH Magazine, Naval Safety Center, NAS Norfolk, VA 23511-5796.

Aeromedical Safety Problems

By Cdr. Richard P. Shipman

THE A-4 instructor pilot led his flight of two onto the duty runway for a section takeoff. He raised his gloved hand to signal "add power," but before he could give the execute, he slumped over in the cockpit. The A-4 started rolling and drifted left off the runway at idle power, coming to rest in the weeds. The pilot was removed by the crash crew and taken to the base dispensary. Diagnosis: loss of consciousness due to heat exhaustion and dehydration aggravated by a recent bout with the flu.

An F/A-18 pilot was fighting two F-15s in a 2 v 2 ACM mission. At the merge, the flight had only one of the *Eagles* in radar contact. Shortly thereafter, the wingman called for a hard turn port. The lead rolled into a 135-degree slicing turn at 425 knots and pulled hard to engage the bogie. With no warning or grayout, the pilot blacked out. Fortunately, he regained consciousness 10 to 15 seconds later but remained disoriented for another 20 seconds. The aircraft wound up in level flight after the pilot came to; if it hadn't he might not have lived to recount the story.

The pilot in command of a P-3C noticed a slight soreness in his abdomen prior to launching on a five-hour dedicated-field work mission. The PPC attributed this soreness to a recent strenuous workout and felt no reluctance to go on the flight. Three hours into the flight, however, the pilot was overcome by severe abdominal pains and was totally incapacitated. The stricken aviator was taken to the galley rest area and his place in the cockpit taken by another PPC who was on board acting as an observer. The pilot was rushed to the hospital after landing where his problem was diagnosed as a kidney stone.

These incidents are just a few examples of the many different aeromedical problems that occur regularly in naval aviation (Note table on physiological problems). In the past two and one half years, there have been 18 mishaps where medical factors (as defined by the Flight Surgeon's Report) have been identified as definite or probable causes in the accident. This total includes 12 Class A mishaps that resulted in 35 fatalities. This number may not even tell the whole story. Many fatal mishaps that may have been caused by incapacitation or unconsciousness were officially attributed to something more general like "loss of situational awareness." And many other mishaps probably had medical problems that may not have caused the mishap but were definite contributors. Factors such as fatigue, stress and life crisis have very real and debilitating effects on the aviator but are difficult to quantify. Clearly, aviation medicine is an important factor in naval aviation safety — maybe one that has not been given its fair share of emphasis.

A current and significant aeromedical problem is G-induced loss of consciousness (G-LOC). Grayout and blackout problems have been around as long as naval aviators have been yanking and banking. But the new generation aircraft such as the F-16 and F/A-18 are a whole new ball game. These aircraft have the capability of sustaining more Gs than a pilot can tolerate using standard anti-G technique and clothing. More significantly, at high energy levels, the pilot can apply G so rapidly that he blacks out instantaneously without going through the traditional tunnel vision and grayout stages.

The magnitude of the G-LOC problem is difficult to gauge. Many fatal accidents have occurred under circumstances that have the textbook characteristics of G-induced incapacitation, yet aircraft mishap boards are reluctant to assign so specific a cause when there is no hard evidence. However, an anonymous survey conducted by the Air Force gives an idea about how widespread the problem is. The survey of 1,680 fighter pilots showed that 20 percent had experienced G-LOC at least once. The Navy's experience is probably similar.

Solutions to G-induced loss of consciousness do not appear imminent. NADC is developing improved G-suits with faster acting air valves. Reclined seats can improve G tolerance, but there are obvious limits to how much the seat can be reclined and still allow normal piloting functions. Martin Baker is experimenting with an ejection seat that has varying angles based on G-loading, but this technology is a long ways away.

On the non-hardware side, medical experts have shown that G tolerance can be increased somewhat through physical conditioning. Weight lifting for upper body strength and moderate aerobic conditioning (jogging no more than 10 to 12 miles a week) are the preferred combination. The most promising answer to G-LOC, in the short run is G-load conditioning through flights in the aircraft and anti-G training in a centrifuge. Beyond that, about all pilots can do is learn as much as they can about G-LOC and be aware of when and where it is most likely to occur.

A physiological problem that is just as dangerous as G-LOC but hasn't received as much visibility is incapacitation for reasons other than pulling Gs. As with the G-LOC mishaps, the exact number of accidents caused by incapacitation is impossible to determine, but many mishaps that were officially undetermined could very well have been due to incapacitation.

While incapacitation is very difficult to pinpoint in fatal accidents, there have been several non-fatal mishaps where incapacitation has been positively documented. The Approach article "Confessions of a Hot and Tired Aviator" (Approach June, '85) tells the story of an A-4 pilot who passed out just prior to starting a section takeoff. More recently, a UH-1 pilot passed out during a carrier qualification flight. He had complained to the copilot about a numbness in his left leg and a tingling sensation in his fingers. The copilot took over the controls and observed that the PIC had slumped over in his seat unconscious. Fortunately, it was a two-pilot aircraft, so

Physiology Episodes January 1985 through July 1987

Problem	Number
Ear/Sinus Block	22
Disorientation/Vertigo	15
Fumes in Cockpit	11
G-IND. Loss of Consciousness	10
Hypoxia	9
Hyperventilation	9
Decomp. Sickness (Bends)	7
Unconsciousness — other than G-LOC	7
Blackout-Not G-Induced	7
Dehydration	6
Incapacitation	5
Simulator Motion Sickness	5
Fatigue	5
Illness — Other	4
Dental Problems	3
Flicker Vertigo	1
Food Poisoning	1

the helicopter returned to land safely. The PIC regained consciousness just prior to landing and was taken to sick bay. The flight surgeon could not find the immediate cause of the pilot's blackout, so he was referred to a neurologist for further evaluation.

While there may have been some major medical problem that caused this pilot's blackout, many loss-of-consciousness episodes are related to a common but serious problem: dehydration. Hot weather, fatigue, recent illness and inadequate fluid intake are the ingredients usually found in these episodes. An A-4M pilot was on his third flight of the day during a weapons det in the desert; outside air temperature was 106 degrees. During start-up he experienced dizziness and a tingling sensation in his fingers. He had the good sense to cancel his flight and shut down the engines. Shortly after shutdown, the pilot lapsed into semiconsciousness. The flight surgeon diagnosed the reason as dehydration.

In another dehydration mishap, an F-14 RIO lost consciousness for 15 minutes during a training flight. He had felt poorly the night before and had some abdominal pain and queasiness the day of the flight. He elected to go flying anyway. After some mild maneuvering, he felt dizzy, became sick and vomited. He thought his problem might be related to hypoxia, so he refastened his mask but shortly thereafter fell unconscious. He remained out all the way back to the field and had to be removed from the aircraft. The RIO suffered from dehydration as the result of viral illness. Think of the consequences if the problem had happened to the pilot rather than the RIO!

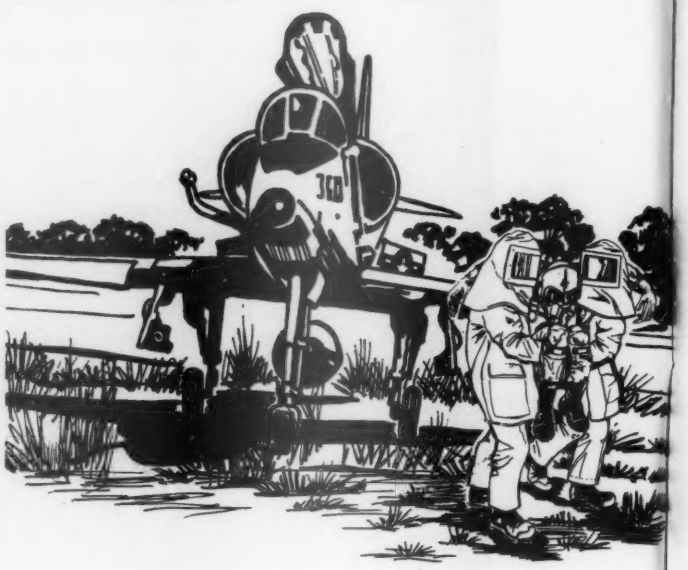
Between January 1985 and July 1987, there were cases of loss of consciousness and five other cases of incapacitation that prevented the crew member from performing his functions. Not surprisingly, almost all of these reports came from the multipilot community. There is no reason to believe that multipilot aircraft communities have less healthy pilots than the naval aviation norm. It makes you wonder how many undetermined A-7, A-4 and F/A-18 accidents could have been related to incapacitation.

That old killer hypoxia is still around and always dangerous in spite of the thorough training all naval aviators receive in the low-pressure chamber. The most dangerous type of hypoxia doesn't come from the explosive decompression at FL 350; that situation is readily identifiable. The real problem comes from insidious sources that sneak up on a pilot rather than hit him over the head. For example, an S-3 crew was climbing through 20,000 feet when the COTAC noticed the cabin altitude was 18,000 feet (it should have been 5,000). The pilot was already feeling drowsy and light-headed. The crew went on oxygen, but the pilot's condition did not improve. In desperation, the pilot took several deep gulps of air and noticed a marked improvement. The pilot examined his oxygen mask and noticed a crack that was preventing the normal flow of oxygen. He descended to 10,000 feet, and all effects of hypoxia ceased.

In what may have been a case of accidental self-induced hypoxia, an A-4 pilot crashed in a steep dive with no ejection attempt. He had been having communication problems, and the mishap board felt that he may have disconnected his oxygen supply in an attempt to trouble-shoot his radio problem (the oxygen hoses share a common connection point with the radio at the seat pan). The flight surgeon estimated the pilot's useful conscious time at his cabin altitude of 22,500 to be around five minutes, given his level of activity and probable anxiety. Having seen how difficult it is to play "patty cake" in the low pressure chamber while becoming hypoxic, it is easy to understand how the pilot may not have been able to reconnect the oxygen hose in the cramped A-4 cockpit before blacking out.

There were at least five episodes of hypoxia that were related to faulty equipment in the 2½-year period. Improperly installed hose clamps, poorly fitted masks and lack of clamps at regulator attachment points were some of the causes. Clearly, preflighting your oxygen equipment is still a lifesaving precaution.

Flight surgeons have been preaching against flying with colds since day one in Pensacola. Nevertheless, ear and sinus blocks still occur regularly as aviators confuse a gung-ho desire to fly with good judgment. For some of the fliers, it was a very painful lesson that we relearned. Ruptured sinuses, perforated eardrums and prolonged grounding periods were common consequences for pilot's misplaced motivation. In more serious cases, the pain from ear or sinus problems



. . .There is no reason to believe that multipilot aircraft communities have less healthy pilots than the naval aviation norm. It makes you wonder how many undetermined A-7, A-4 and F/A-18 mishaps could have been related to incapacitation. . .

became so intense that the crew member could no longer function. The flight surgeon needs to preach no more to those who have experienced the excruciating pain of ear and sinus problems — they are believers! Why does it take such a painful episode to make the rest of us believers?

Most naval aviators are familiar with stress and the negative effects it can have on their flying. Approach has published several articles on the subject including "The High Risk Naval Aviator" (Feb '75) and "Aviator Stress Overload" (May '84). Over the years, there have been many naval aviation mishaps where stress and emotional problems have been identified as possible factors. "A Naval Aviation Tragedy" (Approach, Nov '87) chronicles a fatal accident that occurred to a pilot embroiled in marital, emotional and financial problems. The problem is not identifying these factors after an accident occurs. The challenge for the typical fleet pilot is knowing what to do once the stress exceeds his ability to cope. If you look at the emotional turmoil and stress that is generated simply by going on cruise, you can see that it doesn't take much more to give the pilot a dangerous stress level. But he can't just ground himself for six months until he's back from cruise. About the best that can be hoped for is increased pilot awareness of this phenomenon so they can be extra cautious when they are experiencing a lot of turmoil. Squadron COs, XOs and department heads should also try to be alert to potential personal problems among their pilots. Judicious scheduling, closer supervision, informal or formal counseling are all positive steps that squadron supervisors can take — if they are aware of a problem. Naval aviators are their brother's keepers. Don't suppress information about a squadron mate that prevents him from getting the kind of help he may desperately need.

Fatigue, like stress, is a serious problem that is difficult to quantify. Fatigue is probably even more dangerous than stress because it is so common, and naval aviators learn to live with it as part of the demands of their job. What's more, the amount of sleep you need varies from pilot to pilot, making uniform rest requirements difficult. OPNAVINST 3710.7 (General NATOPS) paragraph 722 establishes guidelines for crew rest. The nature of naval aviation, however, makes following these guidelines difficult if not impossible. Unfortunately, many accidents related to fatigue are rooted in high tempo partying. A T-2 student pilot was killed when he stalled out at the 90. He had had only four hours sleep prior to the flight combined with cumulative sleep deprivation over the previous several days. To make things worse, his circadian rhythms (day-night sleep/awake cycles) had been disrupted within the previous 72 hours, making the effects of fatigue even more pronounced.

So what can we do to minimize the effects of fatigue? Most of the time, getting adequate rest is primarily a function of choosing how to spend off-duty time. A professional aviator has a responsibility to show up for his flights fully prepared to fly. This includes adequate rest just as it includes knowing his mission tactics and emergency procedures. Squadron supervisors can minimize fatigue by prudent scheduling and monitoring their pilots' workload. In the final analysis, though, the only person who really knows how tired you are is you. Use that information wisely in deciding whether or not you are fit to fly.

Prospective naval aviators are thoroughly screened for medical problems before they get into the program. Most aviators are also very health conscious and, with occasional lapses, strive to keep themselves in good shape. All this means that naval aviators as a whole don't get sick much. Ironically, that can be a problem in itself. In some squadrons, "sniveling" off the flight schedule is considered less than macho, something left for the non-hackers. Therefore, the flight surgeon reports are full of incidents, minor and major, of pilots flying when they knew they shouldn't. Physical soundness is particularly critical in single-pilot aircraft for obvious reasons. Yet, nowhere is the "can-do" spirit more prevalent than in the VA and VF communities. The number of reported cases of unconsciousness and incapacitation in the multipilot communities reveals clearly that these things do happen to naval aviators, and they can also happen in the single seaters as well. Somehow, the fly-at-any-cost ethic has to be tempered to tolerate, even encourage, a conservative approach to flying even when the pilot is functioning at 100 percent.

Identifying medical problems that affect naval aviators is the first step toward solving or minimizing them. Investigation of physiological episodes should, at a minimum include a flight surgeon. If a physiological hazard is detected, then a Physiological Episode Hazard Report (PEHR) should be generated. Guidelines for submitting the report are contained in OPNAVINST 3750.6 (The Naval Aviation Safety Program), paragraph 318. Simply stated, any psychological, pathological or physical problem that occurs during or after actual or simulated flight is appropriate. These reports save lives and aircraft. For more information on PEHRs, see Lt. Moll's article, "Paperwork Can Save Your Life," in this issue.

This article has by no means covered all the aeromedical problems that affect naval aviators. Spatial disorientation, diet, exercise, dental care, bends, alcohol abuse and cardiovascular health are just a few examples of other important health topics. The main purpose of this article has been to give you an awareness of the many mishaps that have been related to aeromedical factors. I hope this awareness will cause you to think twice about flying when you are not completely well. But if you are still skeptical, listen to those that have been there. The rest of this issue is devoted to aeromedical problems, written by experts in the field, and by those pilots who have found out the hard way. Learn from their experiences. ◄

Cdr. Shipman is a naval reservist who flew A-4s and A-7s on active duty. He is a pilot for Piedmont Airlines.

STRESS

Can it affect you?

By LCdr. Moe Joyce

"WHAT! Me worry?" Alfred E. Newman's motto takes on a new meaning that it didn't have during our carefree younger days spent reading MAD magazine. For most of us, our stress factors today make our worst worries of yesteryear seem almost trifling. Shoot, back then stress was a flat tire on your bike after baseball practice. Now, you're already 30 minutes late for dinner — for the second time this week — and it's only Tuesday!

We hear a lot about stress. Today's society is fast-paced and highly competitive. However, the stresses encountered in naval aviation are located a notch above the day-to-day stress everyone faces. From day one of training, your career is founded on the principles of competition and striving for perfection. In the average day, what stress factors can hit you that might cause preoccupation during the 0730 flight brief? Let's see. . .

Power failure. During last night's thunderstorm your clock stopped. You're now running 50 minutes late. Your butt is dragging because you were up late polishing up some E-5 evals your boss handed back. Guess you'll skip breakfast. You grab your flight jacket, and out the door you go. A flat tire! The Skipper will never buy this. Take the wife's car. You can call her from the ready room with the news and really make her day. Now you are only a net 10 minutes behind, which you can easily make up on the drive in, even in that 'pig' your wife refers to as 'her car.'

Mario and A.J. have nothing on you as you weave handily through the congested interstate traffic. You're smug, making up precious minutes in spite of a few encounters of the close kind. Your eyeballs uncage, one scanning the vehicles ahead for the slightest opening while the other remains locked on the rear view mirror. No! That blue light can't be for you. Oh, yes it is. There goes the $75 you were saving for a night out with your bride.

Now the delay spent smiling at the state trooper has you at the front gate the same time as every sandcrab who ever collected a paycheck from Uncle Sam. You know the parking lot is going to be jammed by now. You finally hit the ready room, and dead silence falls. The flight lead stops mid-sentence as you slink into place 30 minutes late. Seems the four-plane on the schedule has just been changed to three, and the skipper is waiting for you in his office.

We've just prevented another mishap. We broke the chain before you could get airborne with half a brief and a cursory preflight. Sure, the skipper will chew on you awhile, but you'll fly again another day. You heave a sigh when it's all over because you knew you weren't mentally prepared to man up.

What about the day you manage to just barely make it, but no one but you is the wiser. Where is your head as the brief starts — thinking of how happy your wife is sitting on the garage floor reading the instructions for the jack? Are you thinking of how many friends you made with your unbriefed ACM on the highway? What larger stress problems loom in the background? Financial, marital, physical?

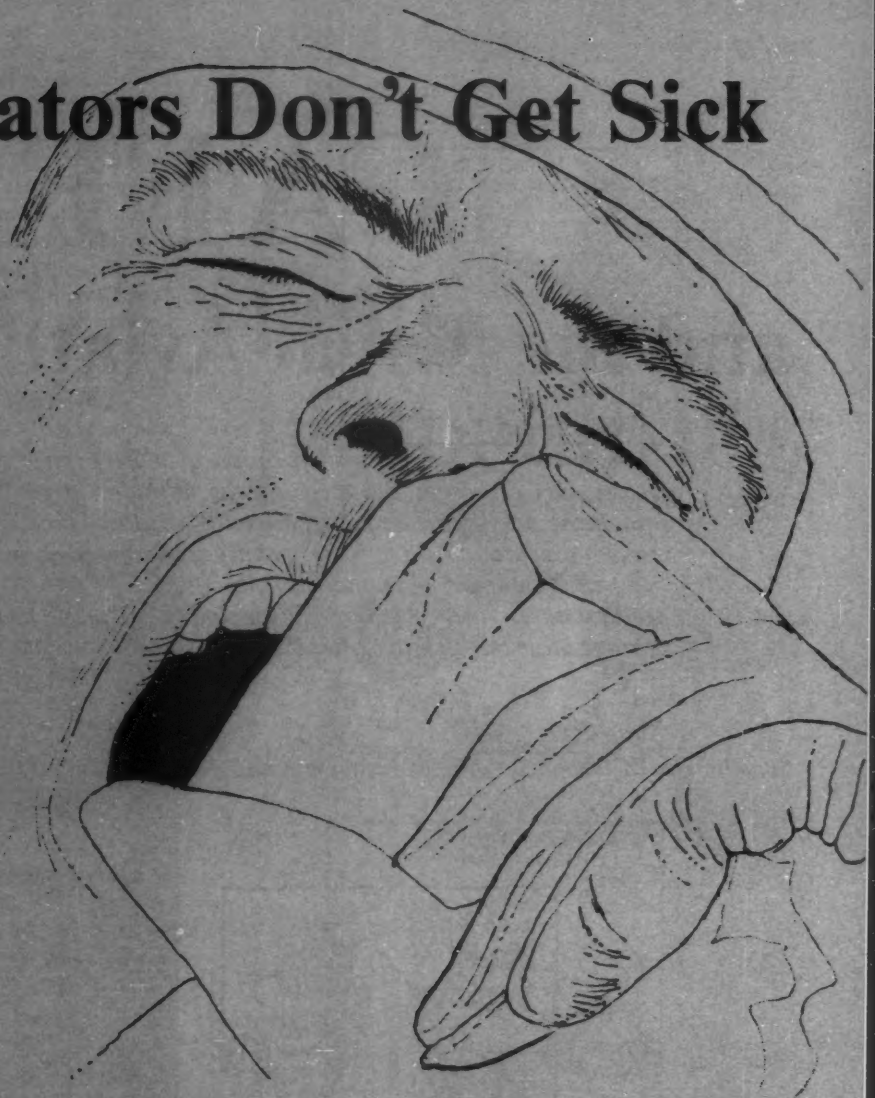
Whatever your problem is, when the brief goes down, you need to focus your full and undivided attention from that moment until the debrief forms are done. You have to be able to compartmentalize stresses and separate them from the flight evolution. If you can't do that, you don't belong in the air that day. Get some help so you are "good to go" next time around. You can't always solve things by yourself, so look for someone who can lighten the load, be it a mate, a flight surgeon, a squadron mate or even a professional counselor. Coping with stress is something that can be learned and cultivated.

Remember old Alfred E. Newman's motto next time you get ready to brief. Start with a clean slate and have a safe, fun flight.

LCdr. Joyce flies S-3s with VS-32.

Naval Aviators Don't Get Sick

By Lt. Richard P. Hajek



. . ."I am a naval aviator and am never ill, tired or anything but 100 percent. . ."

I HATE the thought of being sick! I view illness as a personal affront. I exercise, eat right (usually), drink moderately (usually) and generally take care of myself; therefore, I never get sick.

I might feel tired, but that's usually from extensive hours in the cockpit combined with briefs and the inevitable paper work. I've been on cruise and through days of 24-hour flight operations. I know my personal limits of endurance and how much sleep I need to function efficiently.

My squadron mates know I never get sick. I can always be relied on to be healthy and get out the essential flights while the rest of the squadron pilots are lying on their death beds. Even my wife knows I never get sick. While the whole family is self-medicating (allowed for civilians), I play the role of Fred Nightingale, immune to mortal illness. I am a naval aviator and am never ill, tired or anything but 100 percent.

For two days I had been running at my usual 100 percent but with a nagging feeling of tiredness and a certain apathy. I was a little grouchy, but I tend to get that way when I have to work hard for a few days and don't get quite enough sleep. The only problem was we hadn't been working that hard, and I was getting enough sleep. As I left in the morning for the squadron, my wife remarked that I had been a pain in the rear the last few days and maybe I should see the flight surgeon for the flu that I had evidently acquired somewhere. I had to stop and grouchily explain to her that naval aviators, especially myself, do not get sick.

At the squadron, my department head said maybe I should get someone else to take my flight and take the day off, very unusual coming from LCdr. Slavedriver. I asked him if he was feeling all right. About an hour into the above mentioned flight, my copilot said, "You don't look too good; maybe you should see the flight surgeon. The flu's been going around lately. I was down for three days last week and felt terrible. You look like I felt." I finally took the hint and went to medical after the flight and spent the next day being sick and miserable.

You and I both know naval aviators don't get sick, but now and then we do get to feeling a little off-color. We're competitive and are always willing to work extra hours or fly extra flights. But we're also human and do have limits. I revised my personal limits after this incident when I realized that I shouldn't have been flying that day. We landed safely, but it could have been a tragedy. So take the hint, even if you feel you can hack it. Those who see you everyday can sometimes see things that you refuse to accept. Okay, sometimes naval aviators do get sick, but we're still way above mere mortals. ◄

Lt. Hajek is an E-2 pilot and NATOPS officer for VAW-112 at NAS Miramar, Calif.

CAFFEINE

and the Naval Aviator

By Dr. W.A. Morey, LCdr. G. Dowell and Dr. G.H. Kamimori

The success of a sustained operation or a long-range strike depends on many factors, such as: routes, distances, speeds, altitudes, targets, defenses, weapons, fuel, equipment, intelligence and alternatives. With a lot of time, effort and dollars spent on mission preparation, aircrews frequently receive only secondary consideration.

To ensure maximum mental and physiological performance from our aircrew, we need to address medical planning. One simple way to do this is by making them aware of some basic but effective physiological principles.

"Bombs selected, station 3. Coffee in, master arm on."

YOU'RE somewhere in the I.O.; it doesn't really matter where. It all looks the same. You get up with just enough time to shower and dress before the brief. Hopefully, you'll have enough time after the brief to grab a quick breakfast before manning your aircraft. As you enter the ready room, CVIC is about to give its brief, so you grab a handful of stimulants from the "drug box" and take your seat. During the CVIC brief and subsequent aircrew brief, you grab a few more uppers as do your compadres. The brief runs long so you have only enough time to swing by the wardroom and grab a pastry and probably another pill or two prior to walking out.

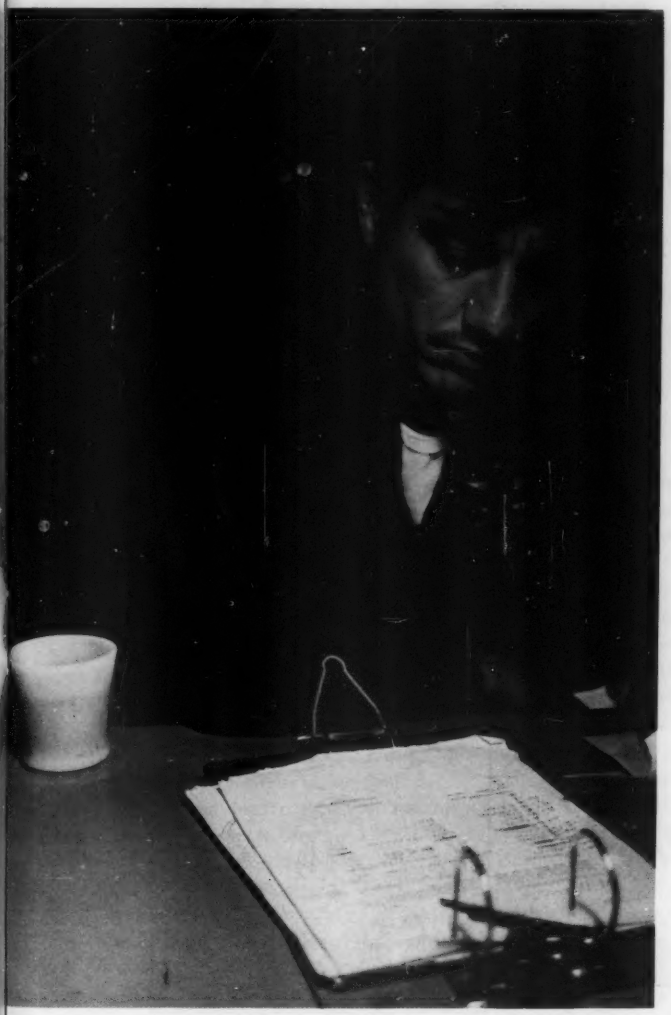
Fiction? Not totally. This scenario happens all the time. The only difference is that instead of taking pills, we drink coffee.

Coffee is a popular drink during work, but is it safe enough for aircrew to use prior to strike missions or during sustained P-3 operations? In moderation, using coffee, tea or soda as

stimulants does not present a problem. In some cases, however, coffee actually may be doing more harm than good.

Caffeine enters the brain and causes the release of certain limited chemical reserves, which is actually the stimulating effect we attribute to caffeine. Too much caffeine depletes the brain's chemical reserves which may be needed during the critical phases of a flight. This is somewhat analogous to needlessly kicking in the afterburner: fuel reserves suffer. The more caffeine you consume on a daily basis, the less it will stimulate you. Consequently, you will need more caffeine to receive the same stimulation, and, eventually, you may not even be able to reach your normal performance level. Also, the more coffee you drink, the lower the lows between cups, and thus, the greater your chance of causing a mishap.

Recent research indicates that as little as 32 mg of caffeine (equivalent to one can of soda) can significantly improve auditory vigilance, visual reaction time and choice reaction time in individuals whose normal caffeine intake ranged from



one to four cups of coffee (400 mg max) per day. This increase in performance occurred after a 12-hour abstention from coffee in both high and low users. This means that regularly drinking less than four cups per day and abstaining from caffeine, for even a half day prior to a mission, and then drinking caffeine *only* during the most critical phases of the mission should improve flight performance.

Let's suppose for the last two weeks you drank three cups per day instead of your usual six. By the end of those two weeks, your body has adjusted to its lower caffeine intake, and one of the three cups provides a greater and longer-acting effect than one of those six cups two weeks earlier. And

because your overall caffeine intake is cut in half, the overall level of caffeine-induced fatigue will be much less than with three cups, and the lows between cups should be less, too. The reduced intake of caffeine also helps you at the end of the day's missions. You will sleep better and be better rested.

Another important point to consider is that caffeine's effects vary from person to person. Generally, at age 30, people begin to metabolize caffeine at a slower rate. Consequently, with age, you need less to drink for sustained brain stimulation. Caffeine has been shown to increase work performance and lipid (fat) utilization during prolonged exercise. Physically conditioned individuals produce larger amounts of plasma epinephrine in response to caffeine ingestion. The increase in plasma epinephrine is partially responsible for the coffee-induced pressor (increase in blood pressure) response. There also appears to be differences in how introverts and extroverts respond to caffeine. The extrovert's performance improves as the dose of caffeine is increased — to a point — whereas the introvert's performance increases for low doses, but decreases with the higher doses.

Another consideration is the interaction between caffeine and nicotine. Nicotine appears to enhance the pressor — increases blood pressure — effect of caffeine, while it reduces caffeine's mind stimulating effects. Hence, in stressful circumstances it may not be wise to smoke and drink coffee. To some degree, this increase in cardiovascular output feeds and worsens the state of anxiety, especially if aggravated chemically.

Much of the above pertains to the issue that the individual should closely consider his own needs and responses to caffeine. A great deal of research has examined the relationship between caffeine and health. To date, no legitimate link between caffeine consumption and cancer, cardiovascular disease, or any other major disorder has been established.

So, how should you use this stimulant? The trick is to use it strategically. Use it when you need it most. For example, just before a critical phase to enhance performance. Cutting back or eliminating caffeine too abruptly can produce withdrawal effects. We recommend you consult your flight surgeon for ways to reduce or avoid headache or constipation. Remember, all things in moderation. ◄

For more on the effects of caffeine, see "To Caff or Not to Caff? Is That a Question?" Approach, May 1985.

Dr. Morey is a neurophysiological researcher in the Medical Sciences Department at the Naval Aerospace Medical Research Laboratory, Pensacola, Fla. His primary areas of study include drugs and aviation performance, and chemical defense.

LCdr. Dowell is the flight surgeon for VA-128, NAS Whidbey Island, Wash. His primary area of study is aviation medicine and sustained operations.

Dr. Kamimori is a research physiologist at the Walter Reed Army Institute of Research at the Walter Reed Medical Center, Washington, D.C. His primary area of study is psychopharmacology, the study of the action of drugs on the functions.

Hypoxia: The Danger Signs Aren't As Obvious As You Think

By Lt. William L. Vant Hof

I REMEMBER when I went through the pressure chamber at NAMI, I didn't think hypoxia was that difficult to recognize. My fingernails turned blue, I got euphoric and people lost their coordination. It was obvious that we were hypoxic because we couldn't complete the tasks we were concentrating so hard on doing.

But what happens when you aren't doing something that is mentally or physically strenuous? Will you be able to recognize the symptoms of hypoxia?

I recently found out on a high altitude mission in the Indian Ocean. Our S-3A had launched on an operational mission that called for us to loiter at 27,000 feet. As we climbed through 17,000 feet, my COTAC noticed that our cabin pressurization was not working properly. We all donned our oxygen masks, and I leveled off at 20,000 feet. As I put on my mask and took a deep breath, I could feel the cool pure oxygen coming in. We set the aircraft into a race track pattern for our now-lower altitude loiter, but after 15 minutes, the COTAC noticed I was nodding off. He called and asked if I was okay. I was semi-awake but realized I was not hitting on all cylinders.

I thought something felt a little funny. A five-hour maximum conserve mission usually makes us all a little tired, but this was only 45 minutes into the hop. The first thing I did was take some deep breaths, and I immediately felt more energetic. The thought of hypoxia immediately came to mind. I checked my oxygen mask and found it had a crack across the face. I discovered when I turned off the oxygen I could still breath through my mask. We then descended below 10,000 feet and completed our mission without further incident.

I learned some valuable lessons. First, I found out that I had not been testing my oxygen mask correctly. Check the airtight integrity of the mask on preflight. I had been lax and simply checked it with the oxygen switch on.

The second and most valuable lesson is that hypoxia does not jump out at you like an engine fire warning light. Hypoxia can creep up and put you in a relaxed state where you become very sleepy and disoriented. If you're flying a long-distance, high-altitude cross-country flight with the autopilot on, you probably will not be in a very active environment. That's where hypoxia can creep up and kill you and your crew. ◄

Lt. Vant Hof is an S-3 pilot with VS-37.

Reflections of a Senior Flight Surgeon:

Special Kinds of Aviator

By Capt. Frank E. Dully, Jr., MC

EVERY squadron commander could benefit by a pocket checklist that identifies behavioral deviances in his charges that would signify the need for special attention. Obviously there is no such gouge. But we have ample experience in other's mistakes that offers a framework against which actions can be compared.

We have identified:

- The Stressed Aviator
- The Failing Aviator
- The Youthful Exuberant
- The Impulsive Kid
- The Bridled Opportunist
- The Maker of the Simple Mistake

The Stressed Aviator

The Stressed Aviator will have to be quantified on a case-by-case basis. This man's problem is that his flying abilities may be temporarily compromised by preoccupation; he is unable to bring his many talents to bear on a particular flight challenge.

The distraction need not be severe or prolonged; it need only come at a bad time. The nature of the problem is such that the aviator is unable to adequately compartmentalize the distraction out of his consciousness, and he ends up with divided attention in an arena that will not allow it.

The Stressed Aviator makes many judgments about coping with everyday stresses colored by a superimposed template of whether his travails are normal or abnormal.

He looks upon some problems as originals, as one-time events that have been visited upon him but not on others. He grapples with them in silence because the flier believes such events involve a certain culpability.

Irreverent hoots await someone who admits to difficulty on post-deployment reintegration into his family. Healthy aviators are not allowed such problems.

The resumption of flying after years in successive staff jobs can be a most threatening experience. These men return to the

fleet in highly visible leadership positions in testimony to their superior performance ashore. Picture the prospective XO who is expected to sail through CQ and hurry out there, but has only flown in the back of an Eastern Airlines 727 for the last seven years. This man is a prime example of a Stressed Aviator — and for good reason.

The Failing Aviator

One type of Failing Aviator is a transitory aberrant whose marriage is in a tailspin. His problem is that he failed to see the importance of his primary support system (his spouse) until it was withdrawn. He may ultimately use the expensive tools of his occupation to inappropriately attempt to counteract this

deeply personal, non-occupational problem. He is a unique risk-taker, and will ignore normal elements of discipline in aviation. We know what he looks like. He can be helped.

The Failing Aviator's failure begins in his home and ultimately spreads into every compartment of his life. His spouse's expectations go unmet, and, frequently, his own expectations are also compromised. Her anger and disappointment becomes aimed directly at him. In her bitterness, his failure is molded into something quite concrete: He has failed as a man.

He sets out on a manly series of ventures designed to prove to the world that he is, indeed, very masculine and very much in command. His antics will take place at the bar, in his automobile, on the playing field, at parties, in leisure activities, in bedrooms and ultimately in his aircraft. This person is not aware that there is a pattern and design to his behavior. The prudent CO will hold a human factors board to confront him. The board may recommend removing him from flight status, insuring that he understands what he has been doing and why, and then give him the time required to restore order to his life by whatever non-destructive means he chooses.

The cop-out response by decision-makers is to simply ground every aviator who has marital discord in his life. Though this is seen in some aviation communities as the safe way to approach the problem, it is wasteful.

The Youthful Exuberant

Many enter naval aviation, where professional precision is symbolized by the tailhook, because the mere adventure of being such a professional is a special magnet. Like the Failing Aviator, the Youthful Exuberant is clearly at risk for behavioral aberrations likely to make him a statistic because he never outgrows his immaturity. He identifies himself by constantly being at the edge of acceptable behavior.

This man will respond to the continuous pressure of others to conform. He ultimately conforms either because his own black-and-blue has taught him the necessity of behavioral limitations or it was made crystal clear to him by important people that his antics were unacceptable.

The Impulsive Kid

Resident in each of us is an impetuous undisciplined Impulsive Kid. He is the one who sails through stop signs and yellow lights. This sublimated youngster is the antithesis of the professional aviator. Education and training in adulthood, if

completely successful, would subvert any likelihood of this childhood vestige surfacing. He issues himself a waiver of rules that have heretofore applied. This one time, he says, won't make any difference, and besides, no one will know.

What the Impulsive Kid fails to assess is that in opting to perform in an arena where he is inexperienced, he is placing himself in the very same jeopardy that he assiduously avoids in *all* other arenas of his life.

Maybe one of our problems is that the "system" subtly allows such activity. Witness the closing of the ranks in either one of two directions when the flagrant deviation occurs. We would be much better off recognizing that without regard for who did it in the past and got away with it, it's not tolerable, period. You don't educate people into this, you pressure them. It takes a hammer, not a book.

The Bridled Opportunist

Perhaps there is one kind of aviator for whom the discipline of the trade I speak of correctly comes closer to being seen as punitive than for the others. This is the Bridled Opportunist. Given the chance, he is regularly going to break the rules. The solution is involvement in a team where flagrant deviance from standard procedures would instantly get him in trouble with the group. When he thinks he can get away with it though, he will be the sandblowing flat-hatter. As long as he believes that the climate in which he operates would *openly* disapprove, he will conform. Are there clues to the existence of the Bridled Opportunist? Can anyone tell in advance that this person would regularly seek to violate the rules for no other reason than that the rules are there? How can you diagnose, in advance, this Forbidden Fruit Syndrome? The answer is to keep track of how close he has come, how many times; know what forces are arrayed that prevent him from crossing the line, and ensure that they are in place. Sometimes we fail to give "the system" sufficient credit for its keeping the behavior of its members within expected parameters. For the Bridled Opportunist, it is what's keeping him alive.

The Maker of The Simple Mistake

Last, but not least, are mistakes — honest, unpredictable mistakes where a wrong course of action was selected. The use of the retrospectoscope to reconstruct events is the way to identify a mistake. Dispassionately selecting options on Monday morning for what should have happened during Saturday's chaos is both easy and objective. The system must be set up so that the simple mistake becomes something from which all can learn. But to punish for a mistake is wrong. If some mistakes are so basic as to indicate severely flawed competence, that is an issue deserving special remedial attention in the training command. The same mistake, such as an approach turn stall behind the boat, requires quite different handling. Neither of these is punitive.

Every blackshoe knows that if he hazards his craft, if he so much as sucks bottom sand into his intakes, he's gone. They'll replace him with somebody who won't. The commanding officer's responsibility in the surface Navy carries a harsh and traditional accountability that surprises no one. What surprises me is that an aircraft commander feels no such accountability. The aviator, like the destroyerman, may well be told to go into harm's way, but not frivolously or not on an ego trip. And not to be part of a system that would let a Youthful Exuberant get in over his head; let a Failing Aviator try to use operational assets to prove an unprovable thesis; or let a damn fool Impulsive Kid behave irresponsibly, even once.

What this occupation lacks is precisely what turned off my students at Monterey. It is discipline in all its subtleties. With it, accountability would be alive, well and living in Naval Aviation. ◄

Capt. Dully is assigned to the Naval Postgraduate School. He is well known for his lecture "Sex and the Naval Aviator," which deals with the personality and various mental and physical stimuli of flight crews.

. . .My guess is that for every report submitted, there is at least one not reported. . .

Paper Work Can Save Your Life

By Lt. Steve W. Moll, MSC

MOST readers will agree that a big-time consumer in naval aviation is paper work. We all want to cut back on the paper work to allow us more time do other things, such as flying. Have you ever seen a bumper sticker that says "I'd rather be doing paper work"? But there is one category of paper work that pays big dividends, one area where we need more paper rather than less. That area is the Physiological Episode Hazard Report (PEHR).

Granted, there may be an abundance of hazard reports on the street. But my guess is that for every report submitted there is at least one not reported. The reasons for this vary.

For one thing, a PEHR is not missed by higher authority if it doesn't go out. If a class A mishap occurs, you can bet someone is waiting for the report at the prescribed time. If, on the other hand, there is a mishap where minor personal injury occurs, no one is the wiser if a hazard report hasn't been filed.

Another reason is that there are commands that are fearful of putting themselves on report. This is misguided thinking. Mishap reporting is an important responsibility of all aviation commands. The command that nearly loses an airplane or a life because of a physiological episode and doesn't report it should be considered an accomplice if a similar incident happens again.

Other hazards go unreported because those involved may have felt that a particular event was not serious enough to warrant reporting or that there was really no lesson learned. Whatever happened simply goes with the territory.

There are communities, to be sure, that recognize a serious threat and, knowing they need some assistance in beating the problem before it beats them, will report it. A good example is the F/A-18 community. The number of G-induced loss of consciousness (G-LOC) episodes reported by these people is abundant. They apparently feel that in order to get NAVAIR to make improvements in this area, they must document the problem first.

But what about those situations that are gaffed off as minor or inconsequential? The number of aircraft lost because of G-LOC are relatively few compared to those caused by disorientation, vertigo or visual problems. Yet how many PEHRs have been submitted recently on these problems?

Who cares? What's it gonna prove? Probably much more than you realize. Let me give you some food for thought that might make things clearer.

Recently, an SH-3 crewman was standing outside the rotor arc waiting to board while the helo turned up. During this time dust was blown into his left eye (with helmet on and visor down) causing pain and a corneal abrasion. He was seen by a flight surgeon and grounded for three days.

Since he only missed a half-day of work, this incident was not reported under either OPNAVINST 3750.6 or 5102.1. Why it wasn't reported as a hazard under 3750.6, I'm not sure. My guess is that someone figured it to be too minor. I would further surmise that this was not an isolated instance. No one knows how many of these micro-FODings occur because people don't feel they're worth reporting. I could be wrong, but my gut feeling tells me this is a bigger problem than most are led to believe.

Information from PEHRs can also be used to give aircrew heads-up info about what to expect (i.e., trend identification). If we can't eliminate a hazard, knowledge that the hazard exists may enable the pilot to plan his moves in advance so he can better cope with the situation and avert disaster.

Picture this. A section briefs a low-level hop over mountainous terrain. The routine info is briefed about target area, weather, loadout, etc. The section leader is concerned with the problem of low-level visual illusions, so he reminds his section that this hazard exists. Sound good? I don't think so. Personally, I would want a lot more info to keep me from smoking myself.

I would want to know what time of day, what terrain features and what leg(s) of the hop might be more prone to setting me up for an illusion. The area of low-level visual problems is one about which we know relatively little. It would be nice to know exactly what sun azimuth and inclination relative to a given heading are more likely to produce problems, and what degree of terrain sloping and foliage cover are most dangerous.

Submitting a hazard report does mean extra paper work. Even though you may not be able to see the benefits of this pencil-pushing exercise, I assure you the information you offer is used. As someone once said. "Be sure to take an interest in the future, because that's where you will spend the rest of your life." ◄

Lt. Moll is an aeromedical safety officer at NAS Key West, Fla.

What's Your Count?

By Cdr. Richard Shipman, USNR,
and LCdr. Kevin Burns, MC (FS) USN

MOST Navy traditions are great: the change of command ceremony, the commissioning of a new ship, the piping ashore of a retired sailor. But there is one Navy tradition that is not so great; in fact, it can kill you. That killer is the typical wardroom breakfast of eggs, bacon and butter-laden toast.

Most naval aviators are health-conscious, but it is hard to keep up with the ever-changing world of what's safe to eat and what's not. In the case of cholesterol, however, virtually every one in the medical world agrees that an elevated level of blood cholesterol increases the probability of coronary heart disease (CHD). According to the National Institutes of Health, people with a cholesterol level of 265 milligrams/deciliter (mg/dl) are *four times* more likely to develop CHD than people with a level of 190 mg/dl. For those pilots who want to keep "slipping the surly bonds" for the foreseeable future, the message is clear: Reduce your blood cholesterol to a safe level.

What level is considered safe? Physicians in recent years have begun to recommend a maximum level of 200 milligrams per deciliter of blood. If your blood chemistry exceeds this value, it's time for diet modification and/or other treatment as prescribed by a doctor. To understand why higher cholesterol levels can lead to danger, let's look briefly at what's happening inside your body when you load it up with eggs benedict and sausage washed down with whole milk.

. . . For those pilots who want to keep "slipping the surly bonds" for the foreseeable future, the message is clear: Reduce your blood cholesterol to a safe level . . .

Cholesterol is not all bad. In fact, its presence in the human body is essential to the formation of connective tissue, cell walls and sex hormones (no, more cholesterol will not make you sexier). The liver produces and metabolizes this essential cholesterol. The problem comes when the combination of the liver's production and the cholesterol absorbed from the food we eat exceeds the amount the body needs. The excess cholesterol then begins to line the arteries with a wax-like buildup, reducing the diameter of the arteries — a condition called atherosclerosis. Atherosclerosis begins in almost everyone in their first 20 years, but it takes several more decades before the coronary arteries, which supply blood to the heart, become blocked sufficiently to give the first symptom of CHD. Unfortunately, this first sympton is often the last: sudden death. More than one-third of CHD victims found out the hard way that there are no "extra time" sessions to make up for poor dietary performance.

The first step in determining if cholesterol is a problem for you is to have a blood analysis. The logical time for this is during your annual physical. Recognizing the serious health threat cholesterol poses, the Navy now tests cholesterol for everyone 28 and older as part of the routine blood workup done during the annual flight physical. If you don't want to wait for your next physical, watch the newspaper for notices of special cholesterol tests given at convenient locations such as shopping malls or community colleges. This mass-market testing is possible because of a new machine that tests cholesterol levels quickly and cheaply, and requires only a small amount of blood from a pin prick in your finger.

The number that you get from your blood test will be your total cholesterol level. The average value for a male in his early 40s is around 215. As mentioned earlier, though, doctors are no longer satisfied with average. A level of 200 should be the maximum.

The total cholesterol level does not give the entire picture concerning heart risk. Total cholesterol is actually made up of different fractions. Simply stated, there is bad cholesterol (low-density lipoprotein or LDL) and good cholesterol (high-density lipoprotein or HDL). The LDL portion of total cholesterol causes the actual "clogging" of the coronary arteries while the HDL cholesterol apparently decreases existing deposits in the arteries. Whatever your total cholesterol level, raising the HDL portion, even slightly, helps lower risk of CHD. To summarize: Your goals should be low total cholesterol, high HDL levels and a ratio of 4.5 or less for total cholesterol divided by HDL.

OK, you've had your blood cholesterol checked, it's above 200 and you've decided to do something about it. If your total count is only slightly elevated and your HDL ratio is good, modifying your diet, exercising and losing weight should get your cholesterol count back where it belongs. HDL levels rise with a program of exercise, diet low in satruated fats and cholesterol, and a reduction in total calories. You may have read about studies that claim a moderate amount of alcohol taken daily also raises HDL levels. Moderate is the key word, as in one ounce of alcohol. When's the last time you had just one beer at happy hour? The police officer performing a roadside sobriety check probably won't buy your explanation that you were vigorously attempting to raise your HDL level. Alcohol consuption may increase your HDL but at the cost of elevated total cholesterol and an increased rate of illnesses from other causes.

Why do you have high cholesterol while the guy you bunk with on cruise lives on fat pills and ice cream and still has a sub-200 cholesterol count? The human body does not metabolize cholesterol and fats the same way in all people, even those from the same family. There's no clear reason for this, although genetics is the likely culprit. Nobody said life was fair.

Most naval aviators exercise regularly and are required to meet weight standards to maintain flight status. That leaves diet modification as the primary method to reduce total cholesterol. No, this doesn't mean that you have to give up pizza or steaks forever. It does mean being aware of what foods are high in cholesterol and saturated fat and substituting more healthful but still good-tasting foods. Your normal diet should be one you can live with the rest of your life. Lowering yout total cholesterol with a special diet around the time of your flight physical is of no benefit. Go ahead and have that pizza but be aware of what you are doing. Substitute a touch of oil and vinegar for salad dressing instead of your usual blue

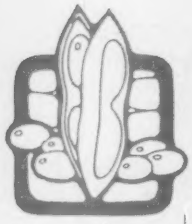
. . . Changing eating habits that we have grown up with takes some adjustment, but the consequences of not doing so are simply too great to ignore . . .

cheese, or maybe order the pizza with green pepper rather than extra cheese or sausage. Your goal should be to limit the total cholesterol and fat in your daily diet. Limiting fat intake to 30 percent of total calories, avoiding saturated fats and consuming no more than 300 mg of cholesterol a day are sound guidelines. Most foods have their fat content listed on the label, but a listing of cholesterol content is rare. Table 1 contains the cholesterol count for some common foods.

Fat and cholesterol are not interchangeable words, but a person's cholesterol level is definitely affected by the amount of fat he eats, particularly the saturated fats. Fats are either saturated, mono-unsaturated or polyunsaturated, depending on their molecular structure. They'll be no test on this afterwards; all you probably need to remember is that saturated fats are the bad kind that raise cholesterol levels, and total fat intake should be limited to about one-third of your daily calorie intake. Some foods high in saturated fats include butter, beef fat, coconut oil (as in pina coladas, unfortunately) and lard. On the other hand, safflower oil, corn oil, canola oil and sunflower oil are high in polyunsaturated fat (the good kind), although their caloric content is about the same. Since all fats have a relatively high concentration of calories, eating too much fat, even the good kind, can lead to being overweight, which is another risk factor for coronary heart disease.

Here are just a few examples of diet modifications that you can make without depriving yourself too severely: margarine for butter, skim milk for whole milk, frozen yogurt or ice milk instead of ice cream, and — for you liberated men of the '80s who help out in the kitchen — a vegetable spray such as Pam instead of lard, shortening or butter for cooking. Products on the market such as Egg Beaters, Butter Buds and Pizza Mate (cheese) can be substituted quite nicely for the real thing. In those recipes that call for eggs, delete the yolks and use just the whites; the end products taste the same and are a lot more healthful. As mentioned earlier, total abstinence from a given food probably isn't necessary, but some substances are so high in cholesterol and saturated fat that they ought to be virtually excluded from the diet of anyone seriously trying to reduce his cholesterol levels. Foods in this category include eggs (yolks), butter, cheeses made from whole milk, coconut oil, palm oil and organ meats such as liver, tongue and brains (no problem there!).

Robert E. Kowalski, a medical writer who had three heart-bypass operations because of cholesterol problems, researched and wrote a best-selling book titled *The Eight-Week Cholesterol Cure* (Copyright 1987, Harper & Row, Publishers). In addition to the diet modifications mentioned above, Kowalski is a strong advocate of oat bran and oat meal. Kowalski references several studies that indicated that regular con-



Food	Serving Size	Cholesterol (mgs)
Yogurt (low-fat)	1 cup	14
Heavy whipped cream	1 tbsp.	20
Desserts		
Angel-food cake	2 oz.	0
Devil's-food cake	3 oz.	37
Marble cake	3 oz.	40
Hostess Twinkies	1	20
Custard mixes	½ cup	19-24
Doughnuts	1 ave.	8-100+
Ice Cream:		
16% fat	1 cup	84
Ice milk	1 cup	13
Frozen yogurt	1 cup	10
Eggs & Substitutes		
Whole egg	1 med.	250
Egg white	1 med.	0
Egg Beaters	¼ cup	0
Fast Foods		
McDonald's		
Big Mac	1	75
Egg McMuffin	1	191
Fish fillet	1	43
Quarter Pounder	1	69
Quarter Pounder with cheese	1	95
Kentucky Fried Chicken:		
Original recipe chicken	3½ oz.	133
Extra-crispy chicken	3½ oz.	116
Fats and Oils		
Butter	1 tbsp.	36
Margarine	1 tbsp.	0

Fish and Shellfish		
Clams (canned)	½ cup	80
Fish sticks (frozen	3½ oz.	70
Haddock	3½ oz.	60
Lobster	3½ oz.	100
Oysters	3½ oz.	50
Sardines (canned in oil)	3½ oz.	120
Scallops	3½ oz.	35
Shrimp	3½ oz.	100
Grain Products		
Pancake mix	1 ave.	33
Meats		
Sirloin steak	3 oz.	75
Blade pot roast	3 oz.	90
Ground beef (27% fat)	3 oz.	86
Lamb loin chop	3 oz.	82
Spareribs	3 oz.	103
Chicken:		
Light, no skin	3 oz.	66
Chicken gizzard	1 cup	283
Chicken liver	1 cup	800
Turkey		
Light, no skin	3 oz.	66
Veal:		
Lean and fat (most cuts	3 oz.	84
Organ meats:		
Beef liver	3½ oz.	300
Chicken liver	3½ oz.	746
Brains	3½ oz.	2100
Headcheese	1 oz.	28

sumption of oat bran reduced "bad" cholesterol levels by as much as 36 percent while increasing "good" cholesterol by 82 percent! There is a medical explanation for this, but it's probably no more important to know what it is than it is to understand the inner workings of an inertial nav system. The important thing is that it works! The oat bran can also be prepared as a hot cereal or eaten in a variety of muffins. Oat bran used to be found only in health food stores but is available now in most grocery chains.

We have been talking about steps anyone can and should take to reduce a cholesterol level that is only slightly elevated. What if your count puts you in a moderate (240-260 mg/dl) or high (above 260) risk group? This is when it's time to talk to your flight surgeon. Don't worry, there's no reason for the quack to ground you just because of high cholesterol if there are no other problems. But you will want to do something soon, and that will probably involve steps beyond diet modification.

Stress has been identified as non-dietary contributor to elevated cholesterol levels. One study found that accountants' cholesterol levels elevated noticeably around tax time. *USA Today* reported that carrier-based fliers had higher cholesterol levels than their non-tactical counterparts, even though diet and other factors — other than the stress of landing on a carrier — appeared similar. Unfortunately, stress is part of naval aviation and is tough to avoid. "XO, I'm not going to take that night flight tonight because it's too stressful," probably isn't going to hack it. But you can reduce everyday stress by common sense actions such as leaving for work early enough that you don't have to worry about being late for the brief. Those aviators predisposed to the "type A" behavior and high stress levels will probably have to be more conscious of their cholesterol and diets than the more laid back squadron members.

Changing eating habits that we have grown up with takes some adjustment, but the consequences of not doing so are simply too great to ignore. The National Institutes of Health has calculated that a 1 percent reduction in blood cholesterol produces a 2 percent reduction in the risk of heart attack. Said another way, your risk of coronary heart disease is cut in half by lowering your total cholesterol count from 300 to 225. CHD in an aviator means permanent grounding, and waivers for this are as rare as rolling five aces. So which will it be: an Egg McMuffin or your flight status? A 16-ounce marbled steak or a healthly heart? Elevated cholesterol is a problem that can be cured. Monitor your blood chemistry, eat sensibly, include oat bran in your diet and see a medical specialist if necessary. Your heart and your family will thank you. ◄

Cdr. Shipman is a pilot for Piedmont Airlines and a frequent contributor to Approach. LCdr. Burns graduated from the Uniformed Services University of Health Sciences in May of 1982 and was designated a naval flight surgeon in May of 1984. He is currently assigned to VAW-120 and is the head of the Aviation Medicine Department at the Sewell's Point Medical Clinic, Norfolk, Va.

To change and to improve are two different things.

German Proverb

Know When to Say No

Lt. Matthew G. Bouzek

"605, Prowler ball, 6.2." After my right-seater made the ball call, all that could be heard over ICS on hot mike was the sound of me dry heaving. How did this happen?

It started in Pusan, Korea. Enjoying a variety of Korean dishes, I made the mistake of eating raw oysters. As the ship was pulling away from the pier, I was in the head throwing up and with a bad case of diarrhea. The next day I had to take myself off the flight schedule.

After a 24-hour bout with food poisoning, I thought the worst was over. Even though I still had a mild case of diarrhea, I decided to go ahead and fly. The other aircrew were flying a lot and standing alerts around the clock. I felt it was time to start pulling my load again.

I made my way down to the ready room for my brief feeling all right but not nearly 100 percent. During the hour-long brief, I drank water continuously trying to replace the fluids I had lost. The cold weather of the North Pacific required that we wear wet suits. Jumping into my wet suit was like stepping into a sauna. I immediately felt the sweat trickling down my body. Along with the sweat was a hint of queasiness, but I thought I could still hack it.

After throwing on the rest of my gear, I headed up to the flight deck. It was nice and cool up there, which was a blessing. I actually felt a little better with the wind hitting me. Too bad I had to jump into the cockpit and close the canopy. The greenhouse effect started immediately.

That was the first time when I thought about telling my crew that I was not up to flying. However, I pulled out two flasks of water and quickly downed the cooling liquid. I felt better for the moment, but now I had a three-hour, war-at-sea exercise ahead with no more water.

That queasy feeling hit me again as I was taxiing into the shuttle, but I figured since I had made it this far, I might as well go flying. I did not want to cancel the hop and have to face my squadronmates' remarks about not being able to hack it. That "can do" attitude took over.

We were soon airborne and headed for the rendezvous. We joined up with three bombers and two fighters. Pushing outbound, I finally admitted to my crew that I was not feeling well. That turned out to be the only thing I did right during the whole evolution. The truth of my admission became obvious when I started the dry heaves. Seeing my discomfort, the navigator considerately passed me his water bottle. I drank its contents gratefully, but it was too late. I was dehydrated. The next 2½ hours were the most miserable I have ever spent in the air.

The navigator and I decided to recover as a single ship rather than come down in the formation of bombers. I was feeling too sick to keep flying formation. I had come close to blacking out twice in the previous two hours, and I could not stop dry heaving. All I wanted to do was trap aboard the ship and get to sick bay.

We went through our descent and before-landing checklist, which included selecting hot mike. My condition had by now

become obvious to the two backseaters. One was an EF-111 navigator on loan from the Air Force. This was his first flight off the boat, and all he could hear was me dry heaving my guts out. Welcome to the exciting world of naval aviation!

I was finally able to break after spinning it twice (didn't they know how sick I was?). Dry heaves and all, I was able to get aboard on my first pass. I still look back and think how lucky I was to have landed safely. It was a fair 2-wire, but all I cared about was that we were on deck.

I jumped out of the plane, stripped off my flight gear and dry suit and headed for sick bay. When the medic on duty checked me, I had a fever of 102 degrees and a pulse rate of 130. Two IV bottles in my arm, two shots in my hip and a horse pill down my throat later, I finally started feeling better. I had had a bad case of heat exhaustion.

I learned several lessons. First, consult your flight surgeon when you are sick. That's what he's there for. If you aren't feeling up to flying, don't! Know your limitations. Don't let the "can do" attitude override your good judgment. Don't let pride make you say "I can hack it." Finally, always drink plenty of fluids before you go flying.

The only right thing I did was letting my crew know my condition. I let them know a little late; we were already airborne. It still gave them a heads-up to pay a little closer attention to me and my flying. Since that day, I swore I'd never fly again unless I felt up to it. ◄

Lt. Bouzek, an EA-6B pilot, is LSO for the VAQ-131 Lancers based at NAS Whidbey Island, Wash.

Ear Block!

By LCdr. J.J. Miller and
LCdr. Rick Parfitt

Friday. The alarm startled me from a deep sleep. Instantly I knew I just wasn't feeling quite right. My throat was dry and sore like I'd been catching flies most of the night, and I felt feverish. Hopeful that this would pass, I went about my morning routine. I was glad that I wasn't on the flight schedule. I just didn't feel up to flying.

By noon I knew I was in trouble. I was beginning to get body aches in my neck and shoulders, and I was sneezing. I had caught a cold, and at that point I was just hoping it was a mild one. Mid-afternoon came and I was dragging. Tired, sore, sneezing, runny nose, that achy feeling all over, I was a living TV commercial. I wasn't accomplishing any worthwhile studying, and I couldn't get any sympathy from my fellow students, so I headed home. Before leaving I checked the flight schedule for Monday. Sure enough I had a flight.

The chills, a 101 degree fever and increasing nasal congestion accompanied me when I arrived home. My wife is always good for at least one day of sympathy, but she wasn't buying my diagnosis of terminal pneumonia. She sent me to bed soon after dinner. I had a little trouble explaining to my 2-year-old why his dad was going to bed before he was, but he wouldn't have understood the effect of self medicating with an over-the-counter cold remedy. I zonked out quickly.

Saturday. Morning came without the fever and body aches, but with a heavily congested head. I felt like my sinuses had been packed with cement. My son got a real kick out of me trudging around the house with two tissues stuffed into my nostrils to stop my nose from running continuously. A simple yawn made my ears pop, as did my attempt to eat a bowl of cereal. In an attempt to breathe normally, I used an over-the-counter nasal spray, and it worked like a champ. I tried tc maintain a normal Saturday routine, but I found I was having to use the nasal spray more and at shorter intervals as the day progressed.

Sunday. I woke up twice in the night barely able to breathe. Groping for the nasal spray was the only path to relief. Morning came with the absence of all cold symptoms except lingering head congestion. Unfortunately, that was the one that concerned me most since I had a flight on Monday. I decided to wait until Monday morning to decide whether or not to go flying. I spent the rest of the day worrying, watching my teams Green Bay and San Francisco lose, and hydrating myself with vitamin C to the point of near bladder explosion in an attempt to flush this cold from my body. By nightfall I was beginning to improve. My ears didn't pop every time I swallowed, and I thought I might be able to fly on Monday.

Monday. Every flight student knows how difficult it is to get scheduled. If you miss a flight it can take three or four days to get it rescheduled. I had lingering head congestion, so I decided to give myself a test before I made my decision. I blew my nose vigorously, applied nasal spray, then attempted a Valsalva maneuver. On the third attempt, with face red and eyes bulging, my ears cleared. Confident I could do it anytime, and armed with my trusty nasal spray and a pack of gum, I went about my planning and preflight. Besides, the aircraft was pressurized just like an airliner. People fly on airliners all the time with colds.

Just before takeoff, I applied another dose of nasal spray. In the climb I began to feel pressure in my ears, but it cleared without the Valsalva maneuver. The simple jaw action of gum chewing seemed to do the trick, and I was confident that I would complete the flight uneventfully. We climbed to 8,000 feet and commenced the hour of high work. In the climb I felt my ears clear three times. Throughout that hour we never changed altitude more than 1,000 feet, and the cabin pressure stayed fairly constant.

We were passing 4,000 feet in the descent to commence practice approaches when I began to feel pressure in my ears. Since I was flying the plane, I couldn't discretely give myself another shot of nasal spray. In an increasing state of panic, I started to chew my gum vigorously and tried to Valsalva. No joy on any Valsalva attempt. The pain had arrived for real by now, and I was beginning to hear a siren in my right ear. Sweat began to form on my forehead. I made one final attempt to Valsalva before asking the instructor to level off before the right side of my head blew off

into his lap.

Just as I turned to the instructor to ask him, a locomotive roared through my skull, and I involuntarily clutched the right side of my head. By now the other people in the flight station had noticed my face spasms. The instructor took the plane and asked me if I was all right. At that point I was in such acute pain that I blurted out, "Take it!" I finally got around to telling him that I thought I had just ruptured my eardrum. We headed back to base to drop off one ashamed and incapacitated student.

I've never been great at handling pain. My wife claims I need the training of child birth. The simplest way to describe the feeling of a sudden eardrum rupture is to imagine having a railroad spike driven into the side of your head. The pain travels over the eye and down to the jaw bone. It comes with accompanying dizziness and nausea. I went immediately to sick bay and saw the squadron flight surgeon.

Flight Surgeon's Comments:

When I saw LCdr. Miller he was in obvious pain, complaining of right ear discomfort, dizziness and nausea. I inspected his right ear canal; it appeared as though his eardrum had just been given a whopping hickey. Essentially, that is indeed what had happened. When a person is unable to clear his ears during descent from altitude, negative pressure — a relative vacuum — develops in his middle ear space. When exposed to this intense negative pressure, small blood vessels in the eardrum and in the walls of the middle ear rupture. Usually the pressure change is not so rapid or so great that it perforates the eardrum, but as this episode demonstrates, that is certainly not unheard of.

In one respect, LCdr. Miller was lucky that he had perforated his eardrum, because this causes immediate repressurization of the middle ear. This stops the damage and lessens the pain caused by the negative pressure. The bad news is that he can't fly until the perforation is healed. Perforations caused by pressure changes are usually small; even so, they usually take four to six weeks to heal completely. During this period, the ear cannot be exposed to pressure change caused by flying or diving under water.

The scenario described above usually doesn't take place unless a person flies with a cold or flu. Only when the upper airway lining is congested will clearing the ears on descent become a problem. In a normal ear, air is able to enter the middle ear space through the eustachian tube during descent from altitude. This repressurizes the middle ear, and the pain from a developing vacuum is avoided. Because the eustachian tube normally collapses shut on descent, it is usually necessary to assist this repressurization with a yawn, jaw movement, or the Valsalva maneuver. When a person gets a cold, as did LCdr. Miller, his eustachian tubes become as congested as his nose. This congestion causes the eustachian tubes to swell shut. Air can now only enter the middle ear with great difficulty, if at all.

As LCdr. Miller so painfully discovered, the ability to clear one's ears during the ascent is no assurance that they will clear on descent. It is much, much easier to clear one's ears on climb out than on descent. In order to explain this phenomenon, we must visit our ancestors, Mr. and Mrs. Caveman, as they were evolving. You see, good ol' Mr. and Mrs. Caveman never made the rapid descents through the air that we are able to make today (that is, not without considerable bodily injury). The only rapid pressure changes they experienced, and therefore the only time they ever experienced ear pain from pressure changes, was when they dove underwater.

So nature evolved a partial one-way flutter valve system in which it is easier to equalize pressure in the ears on the way up (coming to lower pressure on the surface) than on the way down (diving under). If our caveman was to start experiencing pain on descent, he would just come back up to the surface and his ears would feel fine; and, of course, he could breathe just fine.

As we all know, airplanes have been made to fly, but man's evolution has not kept up with his technology. Man can now make rapid — and hopefully safe — ascents and descents through the air. As we know, the rapid ascent isn't necessarily a problem for his eustachian tube's partial one-way flutter valve system, even with a cold and congestion. On descent, however, this congested person may very well start experiencing ear pain. He can still go back to altitude to relieve this pain. The obvious problem, however, is that he can't stay up there forever. He must eventually make a relatively rapid descent, at which time he will probably develop excruciating ear pain, the likes of which his ancestors never had to experience.

We all know better than to fly while congested. There are steps to be taken, however, if some nonbeliever decides to tempt the laws of nature and physics. At the first signs of an ear block, the aircrew should climb back to an altitude where the victim's ear pain and discomfort disappear. The pilot should then commence a slow descent, with the victim performing a Valsalva frequently (about every 200 feet or so). If pain still recurs and if somebody has a bottle of Afrin or Neosynphrone nasal decongestant spray (just for use in emergencies of this nature, of course), the aircraft should again be taken back to altitude. The victim should take three or four good sprays through the nostril on the affected side, while inhaling deeply, to ensure that the eustachian tube openings located way in the back of the nose, just above the tonsils, are reached by the medication. After waiting 10 minutes, the pilot should again begin a slow descent. The victim should again attempt to clear his ears frequently, *before* he feels any ear discomfort. If this doesn't provide relief, I'm afraid our victim is just going to have to grin and bear it until he makes it to a flight surgeon's office. What started out as a common cold and perhaps four to five days grounded has now ended in a very unpleasant experience with a grounding of one to two months. ◄

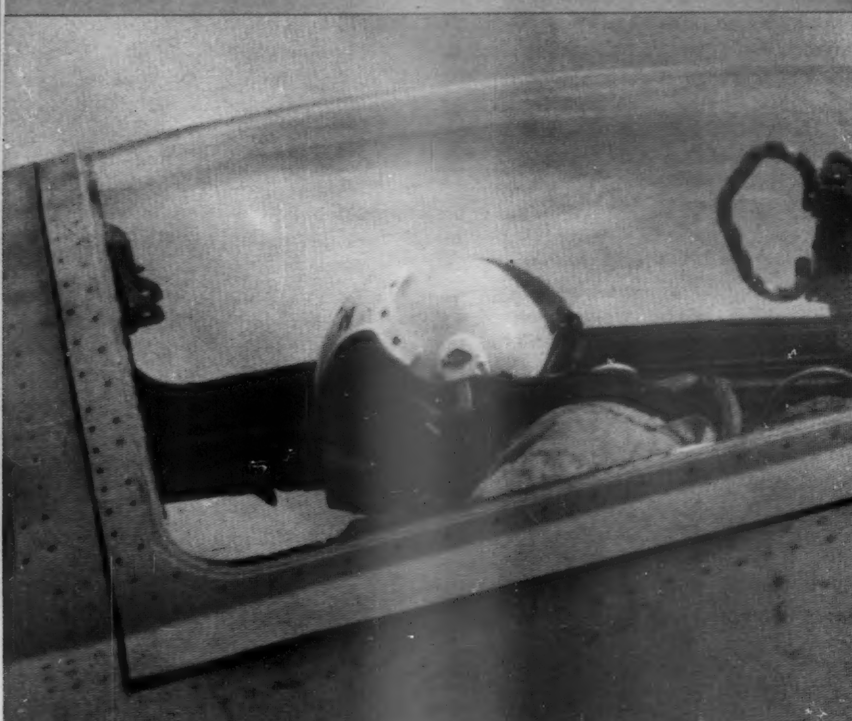
LCdr. Miller is a 1974 graduate of the U.S. Naval Academy. A frequent contributor to Approach, he has accumulated over 3,200 hours of multiengine flight time in P-3s and C-130s with squadron tours in VP-40, VP-31 and VXE-6. He recently graduated from the Naval Postgraduate School with a degree in aeronautical engineering. He is a member of VP-1.

LCdr. Parfitt is a 1982 graduate of the University of Wisconsin Medical School in Madison, Wis. He received his flight surgeon wings in May 1984. His first tour was as flight surgeon for NAS Agana, Guam. He has flight experience in the T-34, H-46, H-1 and P-3. He is assigned as the flight surgeon for VP-31.

[illegible] Consciousness

The following article is the text of a briefing [illegible] experienced [illegible] of consciousness [illegible] during [illegible] ACM [illegible] is [illegible] to talk about it. We hope other [illegible]

It Could [illegible]



By Lt. Jim Braun

On Monday, August 19, 1985, I was scheduled for two ACM missions against F-15s. The first was a 1 v 1, early in the morning; the second was the last go, a 2 v 2. The incident occurred during the fifth and last ACM engagement of the afternoon mission. I was well-rested and nourished.

Entering the merge with my wingman, we had a radar contact on only one bandit. Shortly thereafter, my wingman called for me to turn. I rolled into a 135-degree slice at approximately 425 knots. The next radio call I heard was from the ACMR range officer calling someone "dead" (they had been shot). I wasn't sure who had been shot, so I questioned the call. This distracted me from the work at hand. I was pulling 7.7 G in about 1.5 seconds. Unknown to me, my G-suit had also come unplugged prior to the engagement. Just as I was questioning who had been shot, I lost consciouness. There was absolutely no warning that this was about to occur. I have previously experienced "greyout" and "blackout," but I never really expected that unconsciousness could strike to me so quickly, despite all the excellent lectures and training we've received on G awareness.

I remember coming to, not having any idea where I was. I remember seeing the inside of my eyelids and

Happen to You

hearing my heart beating loudly, like it was between my ears. I felt very comfortable and relaxed, as if I had just woke up from a sound sleep. A radio transmission from my wingman jarred me into realizing I was flying. My vision had returned. I could see that I was wings level, at 12,000 feet MSL, 480 KIAS. I had no idea what had happened or what manueuver I was in when I went out. I called a "knock it off" on the radio as I began to sort things out. I was still groggy.

My first thought was that I had experienced some sort of seizure. I couldn't believe it. Then I started to think that I might have knocked myself out from rapid G onset. I still couldn't believe that it could happen to me, but I did admit to myself that this is probably what had happened.

As I was regaining my consciousness, I had absolutely no fear of crashing. There was no thought of ejecting or keying the mike. Upon regaining my vision, had I been confronted with a windscreen full of green trees, I don't believe I would have been alert enough to eject. I was definitely along for the ride for another 10 to 15 seconds.

After about 20 seconds, I was alert again and flying OK. I called a join-up and began to lead a four-plane back into the break. I was reluctant to tell anyone what had happened and decided to keep quiet. It was a clear day, and I decided it was easier for me to keep the lead than to cross under and fly wing. As we returned I discovered that I was still not back to 100 percent. Break altitude at Cold Lake is 3,200 feet MSL. In a gradual descent from 14,000 feet MSL to 3,200 feet MSL, I descended to 2,800 feet before realizing I was low. By the time I reacted, I was leveled at 2,650 feet MLS, climbing back to 3,200 feet MSL. It also took a call from my wingman to get me to switch to tower frequency. We were already only 10 miles out — normally this call is made around 20 miles. The break and landing were uneventful.

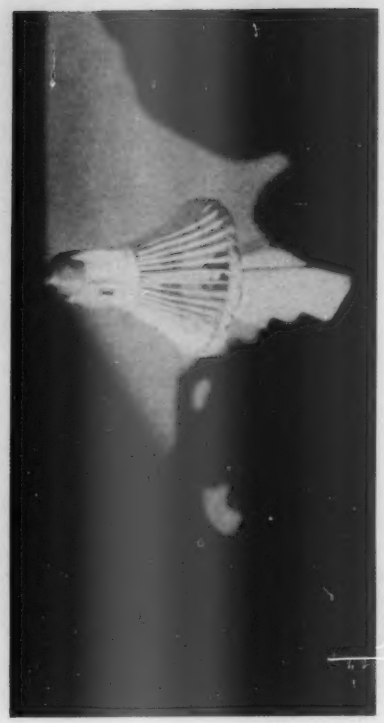
On the ground, I still kept quiet. I almost felt embarrassed that this had happened to me. I have over 1,800 hours in fighters (1,000 in the F-14) and keep myself in good physical condition. Thinking about it that evening, I came to the conclusion that my feelings were ridiculous. If this could happen to me, it could happen to anyone — especially another F/A-18 driver. The F/A-18's pitch rate (G onset rate) is superior to any other fighter in the world.

Watching the playback on the ACMR was a spooky feeling. I watched my airplane fly for that 10 to 15 seconds, during which time I knew I was out. Watching my HUD film the next morning was even more of an eye-opener. Because I recovered in a wings-level attitude, I just assumed I was doing a level break when I lost consciousness. In reality, the aircraft attitude was 135 degrees of bank, 45 degrees nose down, at 450 KIAS. I don't know how the airplane recovered to wings-level attitude. I must have maintained backstick while I was out.

Personally, this was a frightening but powerful learning experience for me — one that I will never repeat. I have gained a tremendous respect for the F/A-18's pitch rate and the hazards of rapid G onset. The incident has not decreased my aggressiveness, but rather has made me smarter. I will never fight if I feel greyout for even a few seconds. I will always relax the G if greyout is occurring. The loss of situational awareness during grey out is a tremendous disadvantage for the extra time rate you're getting. Also, if you're going to turn, you must keep the speed manageable — around 400 knots or so. At 500 knots, a flinch can bring on 7.0 G. You must concentrate hard on the M1 maneuver and know how to do it properly. Snapping the stick back will never allow you time to prepare for the G onset.

Put yourself into a real combat scenario: You're blowing through 500 knots. Suddenly your wingman calls "Break." Could you be the star of this incident? ◄

Lt. Braun is a Navy exchange pilot with Squadron 410, CFB Cold Lake.



Pressure and the Response of Aircrew to Combat

By I. Barnea
Head of Psychology Branch
Israel Air Force

STRESS and fear are natural feelings for anyone who is in danger. Stress is not only natural, but may also help a pilot to respond better when threatened. In such situations, the amount of adrenalin increases, and the whole system enters a state of awareness and readiness. When there is an optimum degree of stress, the level of concentration increases, together with the ability to respond to the problem. On the other hand, we do not always have the ability to adjust the degree of stress to an optimal level. A level of stress that is too high may have a negative affect on the pilot's performance in the air.

There are two main types of stress during combat. The first type is sudden, short and unexpected; it requires a quick response from the pilot to meet the problem. This type of stress occurs, for example, when an aircraft is hit. The problem is that the immediate biological response of the body (characterised by rising blood pressure, accelerating pulse and breath, increasing perspiration, and slowing of the flow of blood to the hands and feet) will interfere with the pilot's ability to think and decide. For example, the stress may lead to a decision to cut the engine prematurely, or to eject. Great importance should be placed on rehearsing emergency procedures, turning them into known and almost instinctive reactions, and on overcoming the barrier caused by stress on the pilot's ability to think and decide.

It is worth noting that, after the initial shock caused by a sudden and unknown stress situation, there is usually a decline in the internal stress. Therefore, one should not be too quick in the initial response.

The second type of stress is the continuous tension faced by aircrew during combat. Aerial combat has a somewhat sterile character; the combatant does not see the overall war picture, does not hear its noise and does not smell its smell. He fights in his enclosed cockpit, with the targets relatively far away. The threat to the aircraft comes from outside, without the reality of the battlefield. The threat facing the aerial combatant in this situation, in many cases, creates a dilemma of whether to respond to the situation or abort the mission. There is no doubt that it is important to stick to the mission and to the basic motivation built up prior to the beginning of combat. Mental fluctuations occur between the battlefield and its stress, the activity and its resulting changes, and the return to the squadron, a calm place, far from the reality of war.

The change between these two situations is very pronounced. Lack of activity on the base can be a fruitful breeding ground for fear. Activity and significant action in the squadron strengthen the combatant and prevent the accumulation of unnecessary pressure. During combat the participant faces death, injury and captivity; close friends are shot down, captured or killed, all of which affect the internal senses of the combatant. Human behavior and our experience in the IAF, show that in situations under pressure, the majority of combatants have a positive mental response and show a higher physical ability to withstand the situation, compared to those who stayed behind.

With the progress of the battle and continuing losses to the

squadron, the threat becomes more real and increases the degree of stress. Another contributory factor to stress is the feeling of dullness, lack of information, or information that changes in a very short time without a great deal of reliability. The feeling of uncertainty can also create a sense of loss of control and insecurity.

An additional cause of stress is physical weakness. Lack of sleep is partially due to the fact that the general degree of stress in the combatant is relatively high, and so it is difficult for him to fall asleep. This is particularly notable during the first days of battle, which are characterized by the mass of events that occur, by unexpected situations and chaotic conditions. A long battle will create weakness and fatigue that will affect the pilot's performance in combat.

Another factor may be changes that occurred during the period immediately prior to hostilities: receiving a new command position, such as executive officer, whereas before he was in an administrative position. Changes in personal life,

such as death in the family or health problems, may also be a factor contributing to the feeling of internal stress.

Body behavior under tension and fear. Combat naturally creates a feeling of tension among all the participants. Behavioral patterns vary. Every combatant should know himself and realize that there is no relief from these variations; they must be faced during combat.

During the first phase of combat, the pilots make a friendly comparison with their fellow crews: how they feel, operated, and whether or not they share the same feelings.

Occasionally, a pilot may think something is wrong because he has strong feelings that he did not have before. He should know that everyone is apprehensive under stress. These responses may affect the pilot's performance. Usually, when the pilot is involved with operational activity — start engines, roll and takeoff — these disturbing senses tend to disappear.

It should be noted that courage is shown in overcoming fear, and not in the absence of fear.

The problem of a combatant is usually to recognize his problem. Commanders must show strong feelings and know their men well, in order to keep control during a prolonged battle.

There are many examples of physical reflexes and behavior under stress.

Physical reflexes include:

- Perspiration, tensing of muscles, rushing of blood, blockage in the dietary system (diarrhea or constipation), increase in pulse, vomiting and shaking of the body.
- Continued lack of appetite or excessive appetite.
- Lack of sleep or nightmares.
- Problems in speech.

Behavioral expressions of stress can cause interruptions (not only temporary) in responses. The combatant may become more intent; he is less aware of what is around him, is quieter and isolates himself from social company. His responses are slower and performed unwillingly. He becomes passive and in certain cases will not volunteer for a combat mission.

On the other hand, the opposite type of response may occur. It is shown by restlessness, nervousness, oversensitivity and depression. Frequently, there will be outbursts of anger or criticism.

A common response is an interruption in ability to concentrate or pay attention. People tend to forget and have difficulty making decisions; they lack awareness of making mistakes or in accumulating them. In extreme cases, they cannot lock onto decision.

There may be a preoccupation with the mechanical state of the aircraft and its equipment, and an exaggerated desire to check that everything is working properly.

In those instances where there is a detrimental effect on the individual's performance that limits his response, excuses may develop for not carrying out missions or malingering.

I wish to repeat that the characteristics listed are not necessarily clear signs or there is a problem that needs professional help. Just the opposite is true; usually the individual is able to deal with the problem himself, and the characteristics weaken or disappear altogether.

The key as to whether or not there is a problem that initially

requires the intervention of a commanding officer is the degree of continuity of the characteristic and the degree of deviation from normal behavior.

Several factors help create a positive reaction.

Motivation and perseverence in the mission. Everything that was invested in the combatant prior to battle will be evident during the course of the battle itself.

Experience and knowledge. The greater the experience of the pilot, the greater his self-assurance. A traumatic and unsuccessful experience will have a negative effect. The ability

to withstand and respond to an engagement can be increased by providing missing information. Potential sources of problems (due to lack of information) should be identified, and practice given to specific tasks. Then, one must train and gain control of the missing data. The feeling of belief in the aircraft and its armament system is also a strengthening factor.

Ground activity. Lack of activity during a period of tension and expectancy is harmful and causes tension to build up. It is

desirable that any activity will be productive to the war effort and not just to keep one busy for the sake of it. The principle of avoiding "empty time" is applicable also, to the period following a return from a particularly difficult mission, as described by one commander: "I found that the best way to recover from the experience of hitting the enemy, losses and fear, is to immediately begin a meaningful and professional debriefing on the mission just accomplished. There is nothing like a professional discussion to put everything into perspective and the right proportions."

Creating a regular cycle of activity and normal rest as far as possible. Fatigue and confusion are the enemies of performance during an engagement. It is important to keep regular rest periods, even by order, and to sustain this pattern. It is also important to institutionalize, as quickly as possible, the order of activity of the squadron during combat by means of training, briefing, organization and management; and this is a feeling of security and faith among the combatants.

Provision of reliable information. In order to reduce the element of uncertainty, it is important to provide reliable information, even if it is unfavorable. There will be an inclination not to give out negative information to the combatants for fear it will affect their morale. It is our belief that withholding information will result in problems of disbelief and demoralization.

Personal psychological defense systems. There is a "defense system" within each of us, such as negating the threat of danger ("It won't happen to me"), rationalizing ("Death in the air is quick and painless"), or fatalism ("Every bullet has a name on it"), and what may be referred to as gallows humor. These systems are important and productive in combat. The problem begins when, as the result of considerable losses, these systems begin to waver and tension increases.

Integrating the squadron. Research has shown that a squadron's integration is the principal factor in the individual's behavior in a combat situation. The squadron should not be looked upon as a collection of individuals, but as a group organization which encourages and helps individuals. This is also true of the integration of an aircrew where there is more than one person to an aircraft. Another factor to social integration is the desire to succeed and not cause disappointment. This is particularly important in an engagement involving other members of the squadron, creates a certain amount of pressure on the individual and at the same time leads to his positive responses.

Command. A basic element — command — is the belief of the pilots in their leaders and their professional ability and behavior. This is particularly important for the younger pilots of the squadron, who are more in need of direction by their leaders, both at the scene of the battle and on the ground. The character and degree of command in the squadron is one of the principal factors that can assist in optimizing the performance of the individual pilot during battle. Command is not just that of the CO himself, but also of the lead crew in the squadron. This crew must act constantly and hold briefings every evening in order to improve their coordination as lead crew. A crew such as this can create a feeling of security and faith by the whole squadron.

As has been said already, during stress and depression there is an increased need for leadership. Obviously, the CO may feel the same feelings as everyone else, but he has to hide their external signs and act accordingly, in order to encourage and guide the squadron. There is no substitute for leadership that creates a feeling of security. Raise the degree of faith and identification with the CO, and the ability to respond to a given situation will be improved.

A war situation extends a combatant to the limit of his ability. The situation creates challenges that are difficult to detail, but can only be met by means of stubborn resistance, an integrated group, and balanced and decisive leadership.

Special thanks to BrigGen. Joshua Shani, Air Force Attache, Embassy of Israel, and Stuart Rosen of Israel Aircraft Service who provided the translation from the original story in Hebrew.

A (Tooth) Fairy Tale

By Cdr. V.M. Voge, MC

NO one likes to go see the dentist (sometimes referred to as the "tooth fairy") — especially when they know there's some work to be done. We all have basic fears of their comfy chairs and what they're going to do once they have us under their power.

I don't presume that dental hygiene is a popular subject for your average sierra hotel naval aviator. That may be one of the reasons you've not recently seen an article about it. However, if you don't pay attention to your teeth, you may end up tango uniform with a down chit. By way of example, I will tell you a true story about a person I've recently had contact with, under unsavory circumstances. The names, ranks, designators and serial numbers have been changed to protect the guilty.

Joe Roger had been afraid of the dentist for as long as he wanted to be a pilot — all his life. The thought of someone actually using one of those jackhammers on his pearlies just terrified him. Somehow, he made it through primary and got to the fleet. He was pretty safe out there. The dental folks only worried about him if he asked them to — and he didn't. At first, he was pretty good about brushing his teeth, but he never flossed. That was for other people to do. Now and then he had to visit the local tooth fairy, primarily during annual flight physicals.

He was frequently told to come in for some very much needed dental work. Of course, he never got around to it. He had more urgent things to take care of. Besides, what could happen to his teeth anyway? Only "fastidious" people (wimps) worried about their teeth. Now our man, J.R., was a real man, and he played the part. He was rough and tough! The only thing that terrified him was pain inflicted inside his mouth. Even the thought of a dentist's office put him into a tizzy.

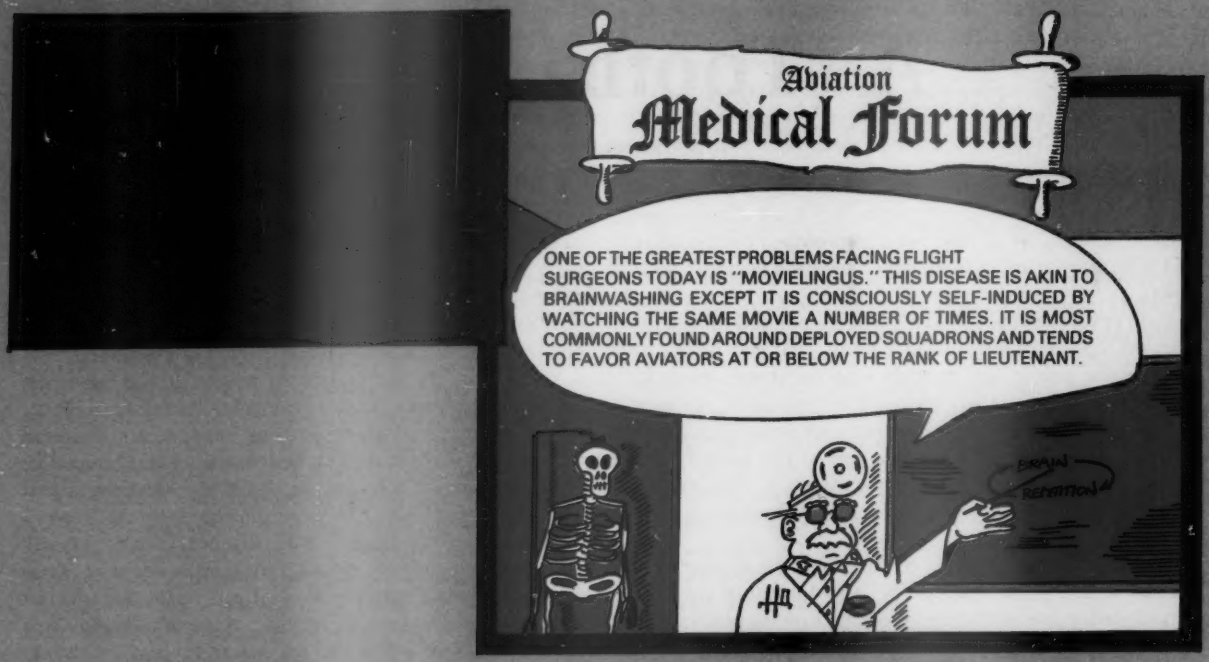
As time passed, the various tooth fairies became more and more distressed with J.R.'s mouth. They put nasty comments in his dental record, such as J.R. refused to take proper care of his teeth, that his teeth were in terrible shape, etc. That didn't worry J.R. As long as he could fly and as long as his teeth didn't hurt (too much), he could hack it. Besides, the tooth fairies only threatened him, and that was once a year. He was well aware that they wouldn't **do** anything. If his CO did get wind of his lack of attention to detail and question him about it, J.R. just said he'd get around to it.

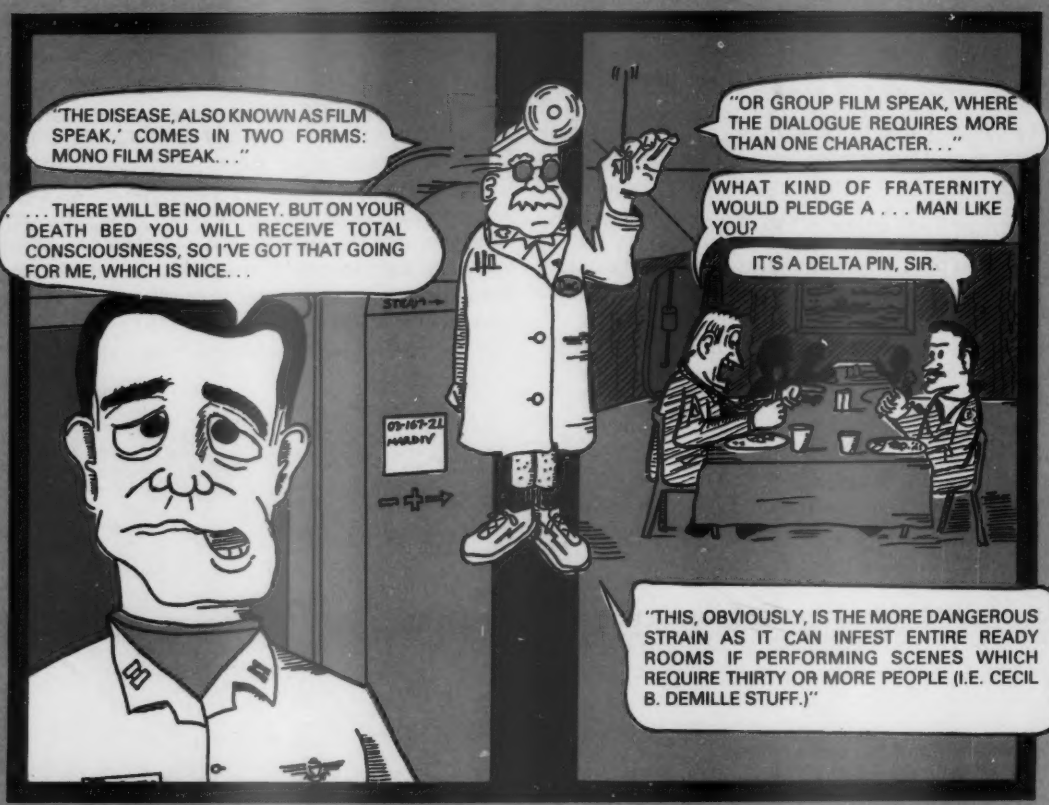
All good deals must come to an end. Poor J.R. was transferred to a CONUS base where the tooth fairy wore steel you-know-whats. He took one look at J.R.'s mouth, stated that J.R. was unfit to fly anything in his present condition (he had severe peridontal disease and a couple of abscessed teeth), and promptly issued J.R. a grounding notice. J.R. was terrified. How dare they do that to him! The squadron was short of pilots (who isn't?), so J.R. sought recourse with his CO. Now, that tooth fairy was nobody's fool. He figured that J.R. would try to get around the grounding notice, so he went to see the friendly flight surgeon. Consequently, when the CO called the friendly flight surgeon to get the straight scoop, that's exactly what he got. Poor J.R. was in danger of an acute abscessed tooth at any moment, which could cause a minor problem in the air (like "incapacitation"). J.R.'s CO ordered him to the dentist's chair immediately, if not sooner.

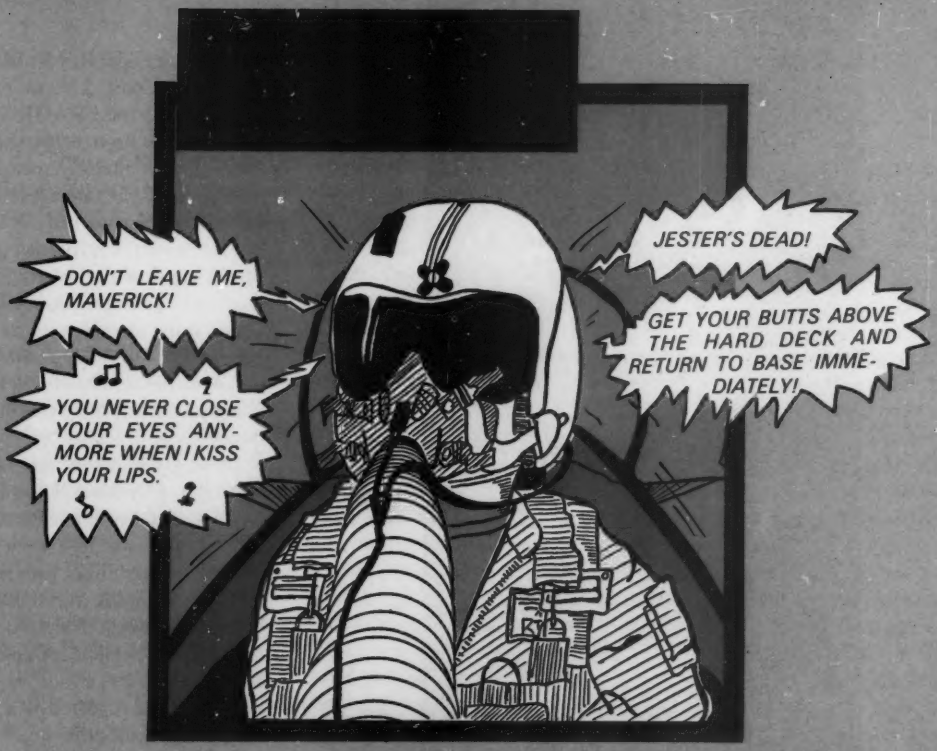
Well, poor J.R. had to face the music. He and the dental officer made a gentlemen's agreement. J.R. agreed to get the work done that was "life threatening," and the dentist agreed to let J.R. fly while the rest of the dental work was completed. Wrong move! As soon as the absolutely necessary dental work was completed, J.R. never darkened the tooth fairy's door again. That is, not until his next flight physical. Unfortunately for J.R., tours of duty usually last two to three years. He should have known he'd get caught. He was just hoping that guy was due for transfer. He wasn't. Due to J.R.'s complete lack of interest in his mouth (except for eating, drinking and telling all who would listen what a sierra hotel jock he was), his mouth was back to its former status at the time of his next checkup. J.R., under direct orders and adult leadership from his CO, is now undergoing all the needed dental repairs. Most of his teeth had to be pulled, but he is getting some fancy new ones.

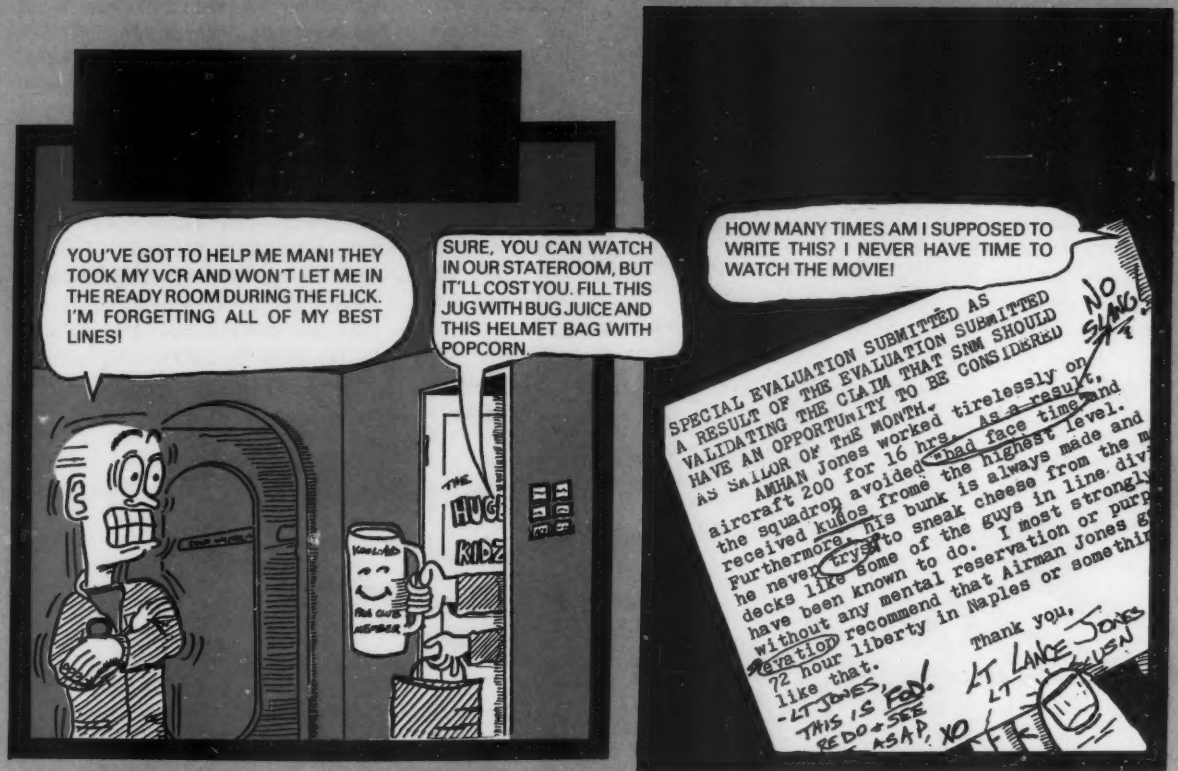
This is a true story. Let the moral of the story be one of the following (multiple choice is always the easiest): a) stay out of CONUS, b) find a tooth fairy who takes bribes, c) be born without teeth, or d) always brush and floss your teeth, and remember that the tooth fairy is only there to help you. So what's the right answer? If you picked d), you win the grand prize, which is — pretty painless pearlies that are really your own for ever and ever. ◄

Cdr. Voge is a flight surgeon attached to the Naval Hospital, Corpus Christi, Texas.


Aviation
Medical Forum
ONE OF THE GREATEST PROBLEMS FACING FLIGHT SURGEONS TODAY IS "MOVIELINGUS." THIS DISEASE IS AKIN TO BRAINWASHING EXCEPT IT IS CONSCIOUSLY SELF-INDUCED BY WATCHING THE SAME MOVIE A NUMBER OF TIMES. IT IS MOST COMMONLY FOUND AROUND DEPLOYED SQUADRONS AND TENDS TO FAVOR AVIATORS AT OR BELOW THE RANK OF LIEUTENANT.
BRAIN REPETITION


"THE DISEASE, ALSO KNOWN AS FILM SPEAK,' COMES IN TWO FORMS: MONO FILM SPEAK. . ."
. . . THERE WILL BE NO MONEY. BUT ON YOUR DEATH BED YOU WILL RECEIVE TOTAL CONSCIOUSNESS, SO I'VE GOT THAT GOING FOR ME, WHICH IS NICE. . .
"OR GROUP FILM SPEAK, WHERE THE DIALOGUE REQUIRES MORE THAN ONE CHARACTER. . ."
WHAT KIND OF FRATERNITY WOULD PLEDGE A . . . MAN LIKE YOU?
IT'S A DELTA PIN, SIR.
"THIS, OBVIOUSLY, IS THE MORE DANGEROUS STRAIN AS IT CAN INFEST ENTIRE READY ROOMS IF PERFORMING SCENES WHICH REQUIRE THIRTY OR MORE PEOPLE (I.E. CECIL B. DEMILLE STUFF.)"


DON'T LEAVE ME, MAVERICK!
YOU NEVER CLOSE YOUR EYES ANYMORE WHEN I KISS YOUR LIPS.
JESTER'S DEAD!
GET YOUR BUTTS ABOVE THE HARD DECK AND RETURN TO BASE IMMEDIATELY!


YOU'VE GOT TO HELP ME MAN! THEY TOOK MY VCR AND WON'T LET ME IN THE READY ROOM DURING THE FLICK. I'M FORGETTING ALL OF MY BEST LINES!
SURE, YOU CAN WATCH IN OUR STATEROOM, BUT IT'LL COST YOU. FILL THIS JUG WITH BUG JUICE AND THIS HELMET BAG WITH POPCORN.
HOW MANY TIMES AM I SUPPOSED TO WRITE THIS? I NEVER HAVE TIME TO WATCH THE MOVIE!
SPECIAL EVALUATION SUBMITTED AS A RESULT OF THE EVALUATION SUBMITTED
NO SLANG
LT JONES
FOD!

What's Wrong With This Picture?

By AMS1 Sal Albanese

IT was a typical Hey Rube exercise at NAS West Coast. I am an experienced crew chief on the ERA-3B Skywarrior. At 0730, one hour before brief time, I checked with maintenance control on the status of our aircraft and reviewed the ADB. I then walked out to the flight line to assist the plane captains in "breaking down" the aircraft. After a thorough preflight inspection, I was satisfied the aircraft was ready to go. I headed for the ready room at 0830 to make the mission brief. Everything was going smoothly. I had done this routine hundreds of times before.

During the ascent and rendezvous with our playmates I didn't feel real well. A touch of airsickness? Happens to everyone once in a while, right? No big deal. As the flight progressed, I was feeling a bit weak and lightheaded. At one point, when I should have been maintaining a good lookout for being intercepted by other aircraft, the navigator had to lean over and wake me up. That was embarrassing. "OK, enough is enough!" I thought. "Let's get with it! Sure enough, there's the Tomcat. We've just been shot down; nothing left to do now but join up with the A-7s and go home. Just stop thinking about the fact that for whatever reason, you feel like losing your cookies all over the lower escape hatch."

We went through some turbulence, which didn't help. Oh well, at least we were heading in the right direction. Soon enough I'd be inserting the down-locks. I tried to take it easy and relax on the ride home. The cockpit temperature felt comfortable, but I was beginning to

. . . "There's the Tomcat. We've just been shot down; nothing left to do now but join up with the A-7s and go home. Just stop thinking about the fact that for whatever reason, you feel like losing your cookies all over the lower escape hatch. . ."

sweat. At this point in the flight, I had not yet told anyone else in the crew that I was feeling sick. And by now, only 30 minutes or so from landing, why bother?

As we got closer to home base, of course, we began our descent, and it was then that the real problem began. It was a slow gradual descent from FL200. When the pilot pulled back power, the cabin pressure rose slightly, as usual, and I could feel my ears adjusting. But as we passed through approximately 8,000 feet, I felt the pressure building against my eardrums.

The first thing I did was the Valsalva. My right ear cleared, but the left ear wouldn't budge. That maneuver had helped before. I began going through the different motions. But this time moving my jaw, swallowing and continuing to Valsalva had no effect. I was surprised. The one problem I didn't expect was a sinus or ear block. I didn't feel congested at all. But somewhere along the line something happened and I could not relieve the pressure in my left ear. The further we descended the more the pain was building up. Passing through 3,000 feet, I was getting desperate. I was trying to clear my ears as hard as I could. The pain was excruciating.

It occurred to me to tell the pilot I was having problems and ask him to level off or maybe even climb up a couple thousand feet. But I rejected this idea. We were in parade formation with three A-7s, and the field was in sight. If I couldn't clear my ears by now, I figured, what difference would it make to hang around up here longer? I'd just bear the pain, and once on the ground and moving around a bit, I'd be OK. Just get me out of this airplane! By the time we were at the initial for the overhead break (about 1,700 feet), the pain in my left ear was so bad that I wasn't aware of what was going on around me. I was sweating profusely and felt generally miserable.

I remember going into the break and feeling the G force, and then a voice over the ICS said, "What's wrong with Albanese?" I got on the mike and answered, "I have an ear block, but just go ahead and land because I can't clear it." The pilot, luckily for me, decided that wasn't the best thing to do. At approximately 1,200 feet, I really thought my eardrum was going to explode. We climbed up to about 3,000 feet where some of the pressure was relieved, and it felt a little better.

I found out later that it was the pilot who recognized I was having trouble and made the call on the ICS. Our seats are positioned back to back, and we cannot see each other. I asked him on the ground how he knew, and he said he heard me moaning. I don't remember making any sounds at all. The ERA-3B is a very noisy aircraft, and to hear anyone else outside your headset is difficult even if they are screaming.

Once up at a higher altitude, I found a canopy wipe in my helmet bag. Holding it up to my nose, I blew as hard as I could. This didn't accomplish anything. I then tried the Valsalva maneuver gain, and this time it worked. What a relief! After informing the rest of the crew, we circled around for a full-stop landing. On deck I felt much better.

Reflecting on this incident, I now realize the mistakes I made. To begin with, I was probably feeling airsick because I hadn't flown in quite awhile. I have little control over that; however, I also neglected to eat breakfast that morning, and that I did have control over. Consuming three cups of coffee before the flight didn't help either. The main thing is that when I knew I had a serious ear block and permanent damage to my ear was imminent, I elected to tough it out on my own. Not too smart.

I am thankful that I was with an alert and experienced pilot who recognized the situation. I had absolutely nothing to lose by letting the rest of the crew know my problem a lot sooner. From now on this aircrewman will not hesitate to admit when he is functioning behind the power curve and might need a little special treatment. ◄

AMS1 Albanese is squadron safety petty officer and an aircrewman on the ERA-3B Skywarrior with VAQ-34 based at NAS Point Mugu, Calif.

Evans' and Bjorn's Law:
No matter what goes wrong, there is always somebody who knew it would.

1stLt. Brad Devries
VMA-542

Following a close air support mission in an AV-8B Harrier II at Twentynine Palms, California, 1stLt. Devries was en route to what he expected to be an uneventfully straight-in approach and slow landing (100 knots) at an expeditionary airfield. The approach was normal, and all landing gear indicated down and locked. Touching down on runway centerline past the arresting gear, the AV-8's left wing dropped suddenly, and the aircraft veered to the left. 1stLt. Devries immediately countered with right aileron and rudder while simultaneously applying the power-nozzle braking procedure: He selected nozzles to the breaking stop (98½ degrees) and added power to 60 percent rpm. The aircraft responded to his control inputs, and he was able to correct back to the runway centerline.

Continuing to roll out, the aircraft still seemed unstable with a tendency to drop the left wing. 1stLt. Devries continued the power nozzle braking procedure until the aircraft come to a complete stop. When power was reduced, the left wing eased down and came to rest on the LAU-7 attached to the outboard pylon. He secured the engine and made a normal ground egress.

Visual inspection revealed a failure of the landing gear actuator eye end, port outrigger, which allowed the outrigger to swing aft. The aircraft was cleared from the runway and inspected. Other than a broken actuator eye end, there was no damage to the aircraft or runway AM-2 matting.

BRAVO ZULU

Lt. Gary C. Bowser
Mr. Steven Evans
HT-8

Lt. Bowser and civilian maintenance trouble-shooter, Mr. Evans, were returning to NAS Whiting Field after recovering a TH-57C at Anniston-Calhoun Airport for an NG generator problem. Ten miles outside Anniston, at 500 feet over a heavily wooded area, Lt. Bowser noticed large and erratic fluctuations in the engine oil pressure and torque. Thinking it was an electrical problem and with no visible landing area in sight, Lt. Bowser turned back toward the nearest safe landing site, three miles away. Less than one minute later, engine oil pressure and temperature began slowly falling toward zero. Realizing an engine failure was imminent, Lt. Bowser continued at 500 feet toward a farmer's field.

Thirty seconds out, the engine chip light illuminated and would not clear. Lt. Bowser initiated a descending left turn and saw rotor rpm decaying to 90 percent.

He lowered the collective, and passing through the 90-degree position, rotor rpm increased to 95 percent. The engine was still running, but not producing enough power for flight. While in an autorotational profile at 100 feet AGL, the crew heard grinding noises and the TOT light illuminated as TOT exceeded 927 degrees Celsius.

Disregarding his instruments from this point and concentrating solely on the landing area, Lt. Bowser continued his descent, and with 10 to 15 feet remaining, rolled off the twist grip and made a perfect power-off autorotational landing. The landing resulted in no injury to the crew or additional damage to the aircraft. A subsequent inspection of the aircraft revealed the nut on the engine oil out line had backed off, resulting in catastrophic engine failure due to oil starvation.

Although not a qualified helicopter pilot, Mr. Evans' assistance during the emergency evolution was exemplary. His calm response and able assistance as a trouble-shooter were important backups.

Lt. Gary C. Bowser (left), Mr. Steven Evans (right).

Lt. David Sohn (left), Ltjg. Brian Reeves (right).

Ltjg. Brian Reeves
Lt. David Sohn
VA-185

Ltjg. Reeves (pilot) and Lt. Sohn (B/N) were performing a pop-up attack on the spar of USS *Midway* (CV-41) in the North Arabian Sea when the inboard half of the port outboard slat fell off their A-6E.

Recognizing the problems of landing an A-6 without slats, the crew climbed overhead to test the slow-flight handling characteristics of the damaged aircraft and to discuss their options with a squadron representative. Due to insufficient wind over the deck and the lack of repair capability at the only divert, the decision was made to bring the aircraft aboard with slats up and flaps down. In this configuration more fuel and stores could be brought aboard; however, a stall would be very sudden and would include a severe nose pitch-up and loss of lateral control. The unusual nose-down attitude also made a bolter much more of a possibility.

The crew set up for a visual straight-in approach as the ship accelerated to get sufficient wind over the deck. Circuit breakers were pulled to disable the hydraulic flaps and slats, and the flaps were then lowered electrically. Approaching with reduced lateral control, axial winds, and maintaining the exact angle of attack to avoid bolter and stall, Ltjg. Reeves brought the aircraft in for an OK 2-wire landing.

LCdr. Craig Grover
LCdr. Scott Beaton
VC-13

While flying ACM on the Yuma Tactical Aircrew Combat Training System (TACTS) Range, LCdr. Grover (pilot) and LCdr. Beaton (copilot) heard a grinding noise coming from their TA-4J's engine, followed by a complete loss of oil pressure. LCdr. Grover immediately turned toward MCAS Yuma for a precautionary approach.

As the engine continued to deterioriate, LCdr. Beaton took over communications and assisted with PCL procedures. When LCdr. Grover noted engine decay below 86 percent, he decided to delay his descent and gain a steeper, faster glide path. With reports from a chase aircraft that sparks and flame were coming from the tailpipe, LCdr. Grover lowered the gear and flaps.

Even though ejection was seriously considered, the crew continued their approach because of concern for military and civilian personnel and buildings below.

Operating on the emergency generator, manual flight controls, and with the engine rpm decaying well below 30 percent, LCdr. Grover landed the TA-4J safely.

Only superb airmanship, Lady Luck and the outstanding crew coordination prevented a major catastrophe.

The decision not to eject was made by the air crew. NATOPS calls for ejection in a flameout situation such as this. The aircrew later said if they had known the full extent of their problem they would have ejected. — Ed.

LCdr. Scott Beaton (left), LCdr. Craig Grover (right).

. . .A Marine has fallen from a CH-46. The medical response team moves the injured man from the hangar bay to the ship's hospital, the largest warship hospital afloat. . .

Cooperation

Navy and Marine Corps Style

By Maj. R.S. Shelton, USMC

IT is a calm night with large, gentle swells as USS *Belleau Wood* (LHA-3) cruises the waters of the South Pacific. Having completed over five months of her six-month deployment, she is making her way from Sydney, Australia, to Honolulu, Hawaii. Everyone aboard is looking forward to the two-day port call in Honolulu. The ship lies 380 miles from New Caledonia and 400 miles from the island of Fiji. There is much speculation about the political status and stability of Fiji due to a recent coup, but the nightly routine aboard ship is, in some cases almost boring. But the boredom will not last long. Over the 1MC comes the announcement: "Man down! Away the medical response team! Lay to the hangar bay!" The question in everyone's eyes is "Why wasn't the announcement preceeded by the customary 'This is a drill!' Unfortunately, the boredom is about to disappear, thanks to an accident.

A Marine has fallen from a CH-46. The medical response team moves the injured man from the hangar bay to the ship's hospital, the largest warship hospital afloat. Initially, there are no fears about the individual's condition. After all, this ship's fully staffed surgical team can handle numerous battle casualties. One Marine, falling from an aircraft, should prove no significant problem. However, that is not the case. After a close examination, the team of doctors find that the man's back is broken and his spinal cord is damaged. There is severe lower body nerve damage, which means the Marine must be in the hands of a neurosurgeon as soon as possible. The only place in the Pacific where this is possible is Hawaii. The Amphibious Ready Group is 2,400 miles to the south.

After a briefing from the on-board surgical team, the senior commander must make a decision: What will be the fate of this young Marine, and to what lengths will they go to ensure he has the best chance for a complete recovery? The Commander of Amphibious Squadron Three, the Commanding Officer of Eleventh Marine Amphibious Unit and the Commanding Officer of *Belleau Wood* arrive at the only viable conclusion: Expense and impact on others are of secondary importance; the Marine's life and health are the prime considerations.

The ship's operations officer, navigator and air operations officer are called together to plan for the movement of the

patient to an airfield ashore. This will allow linkup with fixed-wing transportation to Hawaii. Simultaneously, the Phibron Staff begins planning with higher commands to effect the desired linkup of fixed-wing transportation. COMSEVENTHFLT is contacted and, in turn, CINCPACFLT.

Word comes the early morning hours that diplomatic clearance has been received for the mercy flight into Suva, Fiji. During the planning phase it is discovered that Nandi International Airport operates only on VHF frequencies. The helicopters to be used for the transfer are equipped with only UHF and FM radios. However, the composite squadron included the first shipboard contingent of AV-8Bs. These aircraft are equipped with state-of-the-art VHF radios. The air operations supervisor suggests launching an AV-8B to conduct radio relay between the medivac helicopter, Nandi International and *Belleau Wood*.

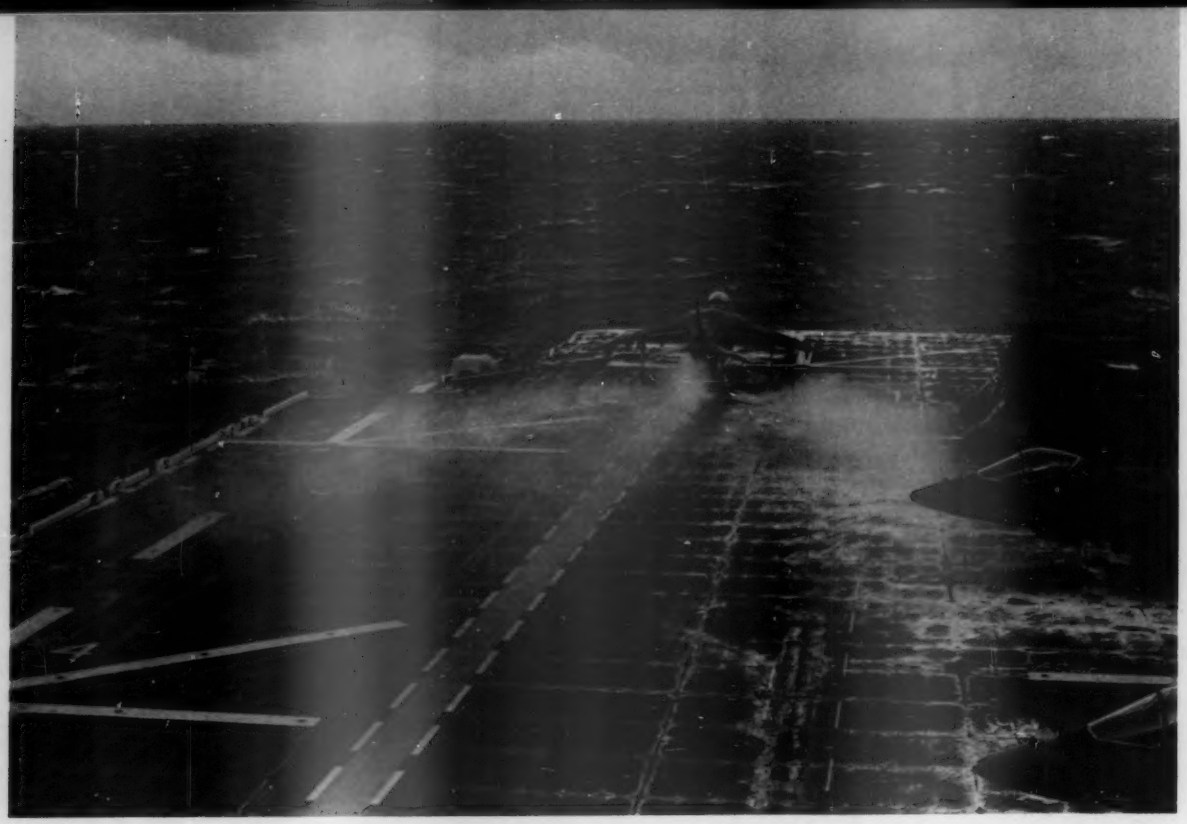
The only problem now is time. The ship must close to within 125 nautical miles before launching the helicopters. With three hours fuel (one internal fuel tank) aboard, CH-46 aircraft will be able to make shore, effect the delivery and return to *Belleau Wood* without having to refuel. Only NATO F-35 jet fuel is available at Nandi. Due to its high flash point, this type fuel is prohibited aboard Navy ships. Crews and aircraft are designated for the mercy flight while flight deck crews and maintenance personnel ready aircraft on the flight deck.

Word is received that a Coast Guard C-130 Hercules will arrive at Nandi from American Samoa. Aboard her will be five medical specialists from USNS *Mercy*. The injured Marine will have very good care en route from Fiji to Hawaii.

As the morning wanes, *Belleau Wood* closes to the launch position. Air crews are readied, and flight coordination is made with Nandi through a high-frequency radio relay.

In the medical department, the patient, in stable but critical condition, is prepared for the long flight. He is secured and comforted with cushions to protect his damaged spine from the vibrations that will be encountered during the flight. The ship, at flight quarters, continues to close on the island of Fiji at full speed.

Four aircraft will participate in the mission. Two CH-46E (YP-04, YP-05) helicopters will launch with internal tanks. One-half hour later two AV-Bs will launch and proceed 60 nautical miles and anchor at the position to effect the vital communications link. Besides its crew, the first CH-46E will carry the patient, two doctors and one corpsman. The second CH-46E will provide flight integrity and mutual SAR support. After one-half hour on station, the second AV-8B will return to *Belleau Wood*, hot refuel and relaunch to relieve the lead. The second CH-46E will accompany the lead CH-46E to within three nautical miles of shore, then loiter over the water until the transfer is completed. This is necessary because diplomatic clearance for only one aircraft was received. Due to numerous air traffic routes and inbound aircraft to Nandi, all mission aircraft are restricted to 2,500 feet or below. The helicopters are ready to depart when, just two minutes prior to launch, a call comes from COMSEVENTHFLT. "Hold



the mission!" The C-130 is at Nandi but is down mechanically for further flight. Another is en route from Hawaii. The mission is now delayed for two hours, a major setback for the patient. He is unloaded and returned to the ship's hospital. The pilots of the CH-46s are thankful, however, for the 40 nautical miles they will not have to cover in each direction. All seems quiet, but you can almost hear the personnel remain at or near their duty stations waiting for the word to begin the mission.

A mid-afternoon launch is now planned, so the patient and passengers will not have to fly at night over open ocean. The CH-46E aircraft launch and are given direct radar vectors to their destination by the Air Operations Control Center (AOCC). The AV-8B aircraft are launched and proceed to their anchor position.

The first AV-8B makes contact with Nandi Approach and begins to relay vectors to YP-05 and his wingman. The three-way radio communication plan is working.

The second AV-8B returns to refuel and prepares to relaunch. The first AV-8B obtains all necessary clearances over VHF radio and relays to YP-05 over UHF radio. YP-05 arrives at Nandi and lands near the disabled C-130 to discharge his patient, but the pilot is perplexed to find no one is there to take him. While YP-05 is on the ground, word comes from CINCPACFLT that the doctors from the USNS Mercy have set up a temporary hospital room in the VIP lounge of the main terminal. It had been decided that the patient will remain there until the second C-130, which is en route, arrives from Hawaii. This word is relayed to the AV-8B and then on to YP-05. YP-05 taxies to the main terminal, receiving all his instructions from the AV-8B aircraft 60 nautical miles away, who is receiving the initial instructions from Nandi Tower, which is only one-half mile away from YP-05. The tower's instructions are followed to the letter; yet YP-05 never speaks to the tower, and the AV-8B never sees the airfield. Truly close teamwork!

YP-05 discharges its patient and requests takeoff instructions via the AV-8B radio relay from the tower and departs Nandi International. The mercy part of the mission is completed. ◄

Postscript: In spite of all the efforts, LCpl. Jeffery Saddler will fight a long hard battle on the road to recovery. The prognosis is 50/50 for a complete recovery. The author and all players in this drama wish him a speedy and full recovery and dedicate this story to him.

Maj. Shelton has made three WESTPAC deployments as a CH-53 pilot with HMM 165(C), and is currently the Air Operations Officer in USS *Belleau Wood* (LHA-3). He served one combat tour in Vietnam and was a designated White House Aircraft Commander with HMX-1.

Up and Ready?

By Ltjg. Curt R. Walther

. . . I noticed this phenomenon as a fledgling in the VTs. Over and over I would see and talk to people in the ready room who had hangovers, were ill or just too tired to fly . . .

MANY naval aviators are afraid to say "no" to a flight simply because they are too tired or don't feel well.

I noticed this phenomenon as a fledgling in the VTs. Over and over I would see and talk to people in the ready room who had hangovers, were ill or just plain too tired to fly. When asked why they were going, they would usually respond, "Well, the IP won't let anything happen," or "A few hits from the 02 on preflight will cure my hangover."

Usually they returned from their flight saying, "Gosh, I can't believe I flew so poorly," or "Man, I don't understand why I got three belows in things I usually get above in." This wasn't always the case. I did know a few people who were not afraid to say they didn't feel that they should fly. These few were never chastised by the instructors or the command. Usually they were commended for their sincerity, which is the way it should be. It is foolish to fly high-performance aircraft when you are not 100 percent.

As we all know some days we feel 4.0, great and energetic; our physical readiness is tip top, we've had proper rest, and we are ready and able. These are the days when it is OK to go and push it to the limits. Not only will you be safer, but you'll have more fun. Other days we may be tired, have a cold or just plain sad because of family problems. These greatly reduce our efficiency as well as our motor skills. It would be best to stay on the ground.

We're not the same every day. Many of us are also athletes. Somedays we play or compete better than on other days. Some days we have it and some days we don't. It is on the days you don't when it's wiser to say no, particularly if you have a long flight planned or are considering playing some hardball IFR.

I remember an all-night flight from Key West to NAS Pensacola with stops in St. Pete, Orlando, Tallahassee, then home. We arrived in Key West Friday afternoon and planned the return trip for late Sunday afternoon. The forecast looked great for the entire way. Since some of the crew had relatives to visit, we decided to meet at the aircraft Sunday at noon. We spent the weekend getting probably too much sun and probably drinking too many beers.

Waking up Sunday morning was not much fun since no one felt 100 percent and then guess what? That's right, the weather guessers were wrong again. Our entire route was solid IFR thunderstorms. Because of winds and all the circumnavigation around thundercells, we had to make two extra stops for fuel. We went into the 10th hour of a six-hour flight with five approaches all just barely above minimums. One three-hour leg to go, and we would be home.

The aircraft commander and I (copilot) were just completely worn out. The aircrew wanted to get home as badly as we did. After a lengthy discussion and several cups of coffee, we decided to swallow a little pride and call the duty office and let them know that we could not make the rest of the way that night, not because of the weather but because we were just too exhausted to fly that kind of flight without some rest.

The weather the next day was just as bad, but with a good night's rest, the flight went quickly and smoothly. After landing, we checked in with the SDO, and he told us that the skipper wanted us in his office *now*! We put our defenses up and got ready for a "you idiots, you wimps" lecture and proceeded to his office. To our surprise we did not get scolded for coming back a day late or even any type of lecture. He just complimented us and said he agreed that we made the right decision.

More pilots and aircrew should realize that there's nothing shameful about saying, "No, not today." After all, tomorrow is another day and most likely a safer day. ◄

Ltjg. Walther is with HS-2 at NAS North Island, Calif. He flies SH-3Hs off the USS *Kitty Hawk* (CV-63).

Dead Tired

By LCdr. L.A. Fox

THE ejection seat's lack of padding made Jack inescapably uncomfortable 90 minutes into his alert 5 watch. Manned and ready on cat 2, he attempted to achieve a state of minimal consciousness under the broken night sky that blanketed the South China Sea. With the canopy open, he was occasionally pushed through a pocket of cool air, which he was able to redirect to his helmeted head with a cupped hand. When he opened his eyes, he caught glimpses of the stars beyond the scud. He had seen the Big Dipper and Orion's Belt through fleeting holes in the clouds. In six minutes he could be on top and possess an unobstructed view of the galaxy, but tonight he was content to close his eyes and listen to the sweep of the ship's radar in his earphones as he awaited his relief, his ticket to leave the flight deck, go to his stateroom and collapse in his rack.

The 5MC flared and the reverberations registered on Jack's ribcage more than his eardrum. "Now launch the alert five! That is, launch the alert five!"

Damn! What am I doing here? Less than half an hour to rack time. Why couldn't they wait. Let's start No. 2. Man, am I tired. I can hang on for the cat shot. Don't forget the takeoff checks. Landing's gonna be a bear. Ready to go. Run 'em up. Lights on. Oooommph! Get her climbing. In the soup. Hello, stars. Hot damn! Four and one-half minutes."

False alarm. Just a friendly subhunter at 200 miles, intercept not required. "Help me out here, George. Spell me until they call me down."

"Three One Two, turn right to intercept the final bearing, report bullseye."

"Come on needles. Sweet needles! Good azimuth, no glide slope. Is the azimuth good? I'll find out soon enough."

The jet leveled at 1,600 feet to prevent extended flight in the gray morass below. The horizontal needle was still a "no-show." Upon reaching his calculated descent point for a self-contained approach, Jack's grip on the stick tightened to a strangle hold, and he entered a world without horizon. The ship jogged right to put the wind down the deck, and Jack chased the final bearing with 10 degrees left wing down. The move saturated his dulled senses. He was late in picking up an increased rate of descent. When he finally did, he missed his rollout on final bearing. His airspeed was right on, courtesy of auto throttles. With a rapid S-turn he captured the proper heading, but when his wings leveled, his fatigued brain did not follow suit. Like a spinning top that's turning too slowly to stay up, his personal gyro fell off 90 degrees. Breaking out into the black beneath failed to alter Jack's sensation that he was flying on his side. His fist rocked the plane with small jerky wing dips as his eyes and ears fought for control of his hand. At one mile he realized he had not been hawking his self-contained checkpoints. He was high.

"Three One Two, three quarters of a mile, call the ball."

"One Two, ball." He could not afford to waste any more brainpower on the call.

"You're high!"

"You're right," Jack said without keying the mike.

The lights of the carrier were visual cues suspended in space. The unreal picture carried the real incentive of avoiding the penalty for mistake. Jack's flying savvy pushed his eyeballs from meatballs to line up to angle of attack to meatball to lineup to lineup. . .

"Power!" The LSO didn't know Three One Two was in auto.

. . .to ramp to meatball to lineup. . .

"Power !!'

. . .to meatball. . .

"Easy with it."

. . .to three wire. . .

"Attitude!!!"

. . .to floorboard as his torso swung forward on arrestment. He forgot to lock his harness.

"Light on deck!"

As Jack flicked off the external lights with his left pinky, his personal gyro did a fast sync to the gentle pitching of the deck. His right hand uncoiled from its death grip. His shoulders slouched as he exhaled fully for the first time since trapping.

"Settle off high start, over control low in the middle, high in close, nose down, come down to land. No grade."

With the resignation of a tired man, Jack's response was low and soft.

"Roger."

Tired? Don't fly. It's an easy answer that doesn't help the pilot who finds himself fatigued on a six-mile final. What helps is wise use of instrument time when lack of sleep is not a factor. Study your instrument scan. If it doesn't have a pattern, give it one. Identify the weak points. Observe the item that drops out first with an increase in task loading. Is it altitude? Airspeed? Vertical speed? Pilots are fairly consistent in failing to monitor a particular indicator before all others. Why? Does the fault lie in cockpit design? Are habits from a different type aircraft being misapplied? Is a lack of recent flight time taking its toll on the ability to pick off information? Whatever the cause, recognize and defend against its detrimental effects. Knowing how your scan deteriorates will help you recognize that deterioration sooner. Practicing a definite scan pattern to the point of automation will help you quickly revert to that pattern with a minimum of conscious effort. The brainpower you save may mean the difference between being tired and being **dead** tired. ◄

LCdr. Fox flies the F/A-18 Hornet with the Dambusters of VFA-195.

The Naval Safety Center's Aircrew Coordination Training Program

By Robert A. Alkov, PhD.

IT was a dark, moonless night with no visible horizon. The SH-3 was on a low altitude training mission. Spotting what he thought was the landing light of an approaching P-3 aircraft, the HAC took the controls from the copilot and initiated evasive maneuvers resulting in a descending left turn from 450 feet AGL to water impact. The copilot, having read in NOTAMS that there was to be a flare drop that night, saw what he thought to be a flare, then began looking for the other traffic that the pilot reported. The RAWS tone was the first indication that the plane was descending, a second before impact, leaving no time to warn the pilot. The HAC started pulling collective when he saw 40 feet on the radar altimeter. This was the first time he had looked inside the aircraft since assuming control. Both pilots were looking for other traffic. The aircraft impacted the water and rolled over. One crewman drowned.

During the brief, specific details of cockpit responsibilities were never determined. The relaxed atmosphere established at the brief and lack of discussion of hazards and specific responsibilities set a tone in cockpit crew coordination that continued into the flight. The copilot apparently was unsure of what was expected of him during the flight. Had he informed the pilot that there was a scheduled flare drop and that what they were seeing looked like a flare, the pilot might have seen it for what it was, broken his fixation and recovered in time.

An A-6E on a night, low level systems attack flight, started its final run-in at 360 knots, 1,000 feet AGL. During the first minute, the aircraft accelerated from 370 KIAS to 440 KIAS. Realizing they were going to be early because the aircraft clock was out of synchronization with the range tower clock by eight seconds, the B/N asked the pilot to slow down. The LAWS warning, set for 900 feet, came on several times during this portion of the flight, but the pilot pulled back up to 1,000 feet each time — except the last. The last time it came on the tower was transmitting a message to the mishap aircrew. The B/N instructed the pilot to "slow down . . . quick." The pilot put the speed brakes out and pulled the power to idle, slowing to 300 KIAS, setting up a high descent rate from which he didn't recover. There was no ejection attempt as the aircraft impacted the target area, and the pilot and B/N were killed on impact.

Aircrew error accounted for 51 percent of the overall Navy/Marine Class A flight and flight-related mishap rate during the past 5½ calendar years (January 1983 through May 1988). During this same time, 54 percent of Class A flight and flight-related mishaps in Navy/Marine rotary-wing aviation were attributed to aircrew error. Of these helicopter aircrew error mishaps, 62 percent had some degree of poor crew coordination, and in 9 percent, lack of situational awareness was a contributing factor. Another 24 percent could be attributed to poor judgment. For the EA-6 and A-6 aircraft communities, pilot error during the past 5½ years accounted for 52 percent of the Class A flight/flight-related mishaps. Of these, 58 percent were related to poor aircrew coordination, 21 percent due to a loss of situational awareness, and 41 percent were due to poor pilot judgment. (These factors add up to more than 100 percent since there may be more than one human factor assigned in any one mishap.)

Flight experience, proficiency, life style and personality affect the quality of cockpit communications. Crew coordination is adversely affected where communications break down in the cockpit. Naval Flight Officers should be encouraged to offer verbal assistance, including opinions on mission parameters, regardless of the seniority of the pilot. Naval aviators must be impressed with the need to heed the inputs of their copilots and NFOs. Mission briefing must include a discussion of specific cockpit procedures and communication responsibilities.

With advances in aircraft design, maintenance procedures and standardized operations, aircraft have become more reliable. However, their aircrews, who are highly trained in dealing with programmed mechanical problems, are not preventing catastrophic aircraft accidents. Concentrating on cockpit human engineering design, better pilot training programs and improved NATOPS procedures has helped, but pilot factor mishaps continue to occur. Aircraft accidents tend to be attributed less to mechanical failure and more to human error. In recent years, there has been a growing realization of the significance of the lack of crew coordination and situational awareness as contributing factors to multi-crewed aircraft mishaps.

In the 1970s, researchers for NASA started conducting interviews of airline pilots. In exchange for confidentiality,

Some unexpected side effects of the training have been reported by the squadrons that have had their "stand-up." For the first time in some squadrons, RTS students and instructor pilots are talking to each other and discovering that there is a lack of standardization in their flight instruction.

these pilots discussed their experiences during "near-miss" incidents. The object was to structure a meaningful research program to address some of the more perplexing problems that were the underlying factors causing so-called "pilot error" accidents. This interview program led to the Aviation Safety Reporting System (ASRS). Over a six-year period, 28,000 reports to ASRS were examined. It was found that 70 percent of these reports contained evidence of failures and breakdowns in communicating or relaying information. Based on these reports, in 1979, Dr. Pat Ruffell Smith, a psychologist working at NASA's Ames Research Center, conducted a study of the interaction of pilots in a simulator. He concluded that high workload conditions can lead to a decrease in the performance of flight crews. Many of their problems related to the management of human and mechanical resources in the cockpit. The variability between crews in reacting to the same problems suggested to him that those who perform less well might be helped by special training. He went on to recommend that special training in resource management and leadership be developed and validated.

During the past several years, the FAA has held a series of workshops to assess possible approaches to the growing problem. Many airlines voluntarily began to develop and teach courses for their crews on cockpit management, in the absence of any regulatory requirement. There are at least 16 well-established courses today, and many more are being proposed. The goal of the training is to improve management skills and the ability of each crew member to work in harmony with others. This is done by increasing every individual's awareness of the impact that they can have on others, and how, with this recognition, they can more effectively interface with those whom they come in contact. The ultimate objective is a more efficient, proficient and safe operation, which United Airlines defines as synergism in the cockpit. The program is based on a seminar format that provides role-playing opportunities for crew members to confront situations that are true to the experiences that occur on the line. Feedback on each individual's effectiveness is provided by their fellow participants in the seminar.

In 1979, and again in 1987, NASA sponsored conferences on Cockpit Resource Management (CRM) Training. The 1987 conference was co-sponsored by the Military Airlift Command (MAC), which has embraced CRM training wholeheartedly. MAC uses their Mission Oriented Simulator Training (MOST) to teach crew coordination, decision making, and leadership and management skills in addition to systems knowledge, operating skills and aircraft handling. The US Army has developed a 19-step CRM package for rotary wing aircraft under the leadership of LtCol. Craig Geis (now retired). Colonel Geis's program includes training in decision making, situational awareness, stress and fatigue, attitudes, workload assessment and time management, communications skills and conflict resolution in addition to the standard CRM skills.

In 1984, responding to the lack of progress in further lowering the aircraft mishap rate, the Commander, Naval Safety Center tasked his staff to come up with ideas to enhance the Navy's aviation safety posture, particularly in the area of human error. The Aeromedical Division of the Aviation Safety Directorate responded with a prospectus to develop a crew training package that would teach cockpit resource management skills to Naval aviation personnel. A five-year program was proposed to the Naval Safety Center's major claimant for funds, CNO (OP-09BF), starting with POM '87. In August of 1986, the Commander, Naval Safety Center, wrote a personal letter to the DCNO (Air Warfare) stating that "Crew coordination problems, well documented in our helo communities, are beginning to appear with increased regularity in TACAIR." The letter asked that all NATOPS model managers review their flight crew coordination section to develop improved standards. A conference was called at Headquarters, Marine Corps, and OPNAV during October-November 1986 to implement such a review.

At a workshop meeting of the Joint Aviation Safety Human Factors Subcommittee held at Fort Rucker, Ala., in November 1986, various experts in pilot decision making and aircrew coordination training outlined programs funded by the FAA and NASA to develop training materials for the airlines and general aviation. The Naval Safety Center drafted a statement of work for a training contract based on this data and the work reported on CRM during the Aviation Psychology Symposia series held at Ohio State University every other year since 1980. Material from the FAA and Transport Canada's pilot judgment training program was also adopted.

Sponsored by CNO (OP-05) a trial program for helicopter fleet replacement training squadrons has now ended. A contract for developing such training was awarded to the Allen Corporation of America, a subsidiary of The Singer Company. HSL-30 at NAS Norfolk, and HSL-31 at NAS North Island, representing the LAMPS MK II group, were the first Navy squadrons to receive the training. The Marine CH-46 and CH-53 communities, represented by HMT-301 and HMT-302 at Marine Corps Air Station Tustin, Calif., and HMT-204 at Marine New River, Jacksonville, N.C., were the first Marine squadrons to receive this training. The UH-1/AH-1 FRS, HMT-303, at Camp Pendleton, was later included. Representing LAMPS Mark III, HSL-40 and 41 at NAF Mayport, and NAS North Island, respectively, have been trained. The SH-3 FRSs, HS-1 at NAS Jacksonville, Fla., and HS-10 at North Island also completed this training, while the H-46 squadron, HC-3 at North Island and the SAR Model Manager, HC-16 at NAS Pensacola, were also trained under this contract. Navy H-53 training by HM-12 at NAS Norfolk was added later and has now been completed.

The training program goes beyond the usual leadership and assertiveness training as developed by various airlines under

their cockpit resource management training themes. The curriculum covered aircrew judgment, situational awareness, coping with stress, risk management, workload assessment and time management, the use of checklists and flight planning, and developing communications skills. The goals of the program were to develop a standardized crew coordination training program, run by and for the FRSs, which would be expandable to other aircraft communities.

Squadron flight instructors were initially trained for two weeks at the SimuFlite Training International Division in Dallas. The contractor was required to spend two weeks with each squadron helping the instructors trained at SimuFlite to "stand-up" the training for the remainder of the instructors in the RTS. This was a "turn-key" effort with the contractor, leaving the squadron capable of carrying on its own training at the end of contract in a year's time. Feedback and evaluation was sought from the squadrons involved to determine the degree of success of the program. To date, the feedback has been favorable.

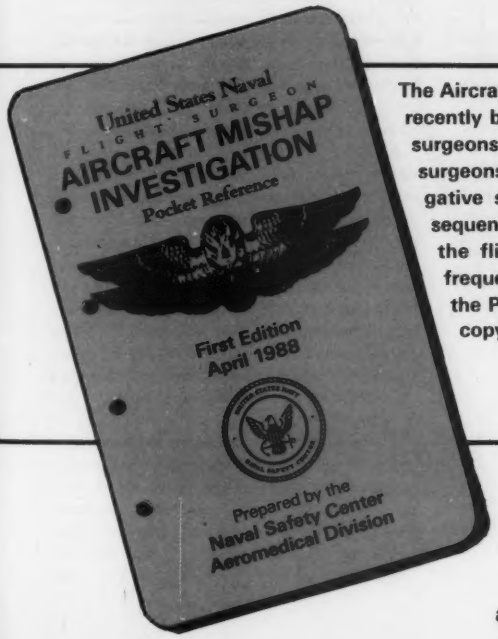
Some unexpected side effects of the training have been reported by the squadrons that have had their "stand-up." For the first time in some squadrons, RTS students and instructor pilots are talking to each other and discovering that there is a lack of standardization in their flight instruction. The instructors who have gone through the course at SimuFlite report that they are better instructors for the training. In addition to being safer pilots, all concerned feel that they will have a smoother, more efficient flight operation due to this training.

A follow-on contractual effort to expand the program into TACAIR during fiscal year 1989 has begun. The EA-6 and A-6 fleet replacement squadrons at NAS Whidbey Island, Wash., VAQ-129 and VA-128 as well as VA-42 at NAS Oceana, Va., will be receiving the training during the fall of 1988. The S-3 squadrons, VS-40 at North Island, and VS-27 at NAS Cecil Field, Fla., will also be added then. VAW-110 at NAS Miramar, San Diego, Calif., and VAW-120 at NAS Norfolk, flying the E-2C, will be included in the program, as will VAQ-33, flying the A-3B at NAS Key West, Fla. VF-124 at NAS Miramar and VF-101 at NAS Oceana, will represent the F-14 community.

Hopefully, training can be expanded for all multiplaced aircraft RTSs including the P-3, C-130 and the C-9, and for six Naval Air Training Command air wings. The single-seat tactical aviation communities have shown considerable interest in a training program to enhance pilot judgment, situational awareness and communications between cockpits. The project was conceived as a research and development program to prove the ACT concept in reducing pilot-error mishaps. When the materials and methods are perfected for squadron use, the training will be turned over to the Navy's aviation training commands. In order to maintain effectiveness and take advantage of the latest developments in the field, it will be necessary to continue to train flight instructors as facilitators in conducting these seminars. Also, quality assurance and standardization will have to be maintained.

By whatever name it is called — Aircrew Coordination Training, Cockpit Resource Management or Aeronautical Decision Making Training — this program is an idea whose time has come. All major airlines and the Air Force, Army and Coast Guard have developed and are using such programs. Eventually this training should be made an integral part of initial flight training and all mission-oriented flight instruction in the Navy and Marine Corps. ◄

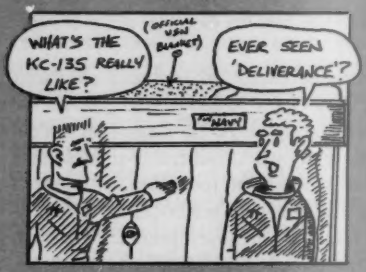
Dr. Alkov heads the Aviation Safety Programs Branch of the Naval Safety Center's Aeromedical Division.



The Aircraft Mishap Investigation Pocket Reference for Flight Surgeons was published recently by the Naval Safety Center. The 122-page book was written to assist flight surgeons in retrieval of information during mishap investigations. Since most flight surgeons investigate mishaps infrequently, developing and maintaining sharp investigative skills can be difficult. Sometimes errors are made because of the rapid sequence of events following a mishap. The Pocket Reference was compiled to help the flight surgeon avoid some of the common pitfalls encountered in these frequently chaotic situations. Every operational flight surgeon should have received the Pocket Reference. If you have not received a copy, send a letter requesting a copy, including a self-addressed mailing label, to:

Naval Safety Center
Aeromedical Division (Code 14)
NAS Norfolk, VA 23511-5796

LETTERS



Plaudit for Brownshoes

Milton, Fla. — Hooray for "Brownshoes in Action Comix." They *are* the kind real aviators like. Congratulations to Lt. Ward Carroll, VF-32, for this wonderful series. Cartooning of this caliber is in keeping with the fine tradition of such aviation safety cartoons as "The Break" and "The Night Before Christmas." Let's hope this *is* a series and not just a spasm.

Lt. Patrick J. Fetter
VT-2, NASWF

• Thanks, all credit is due to Lt. Carroll who promises more cartoons as long as we give him subjects. We've got several more ready to go. Look for them! — Ed.

Re: A Sure Thing Never Is (Nov '87)

Amissville, Va. — This article brought back vivid memories. A similar case of mistaken identity happened to me in 1954 but under simulated IFR conditions. Since we were in VMC during a training flight, I didn't write it up because I thought it could never happen during an actual GCA in IMC.

I was flying a T-33, giving an instrument check. We had returned from the airways portion, made a penetration to a low approach and requested a practice GCA. During the usual lost comm instructions, I noticed we were not over the usual ground track. Since we were in VMC and I had good visuals on other traffic in the area, I let the approach continue and convinced myself we were being vectored differently for traffic separation.

As we turned on base leg, we almost went through the destination field pattern on final. Although, we were well right of course and too far downwind, we kept hearing, "on glide path, on course, X miles from touchdown."

When we were instructed to "take over visually," I advised GCA we were 200 feet over an auxiliary airfield. There was a prolonged silence from GCA, followed by vectoring information for identification purposes. GCA asked if another approach was desired. We responded affirmatively. On our next approach we ended up on center line at decision height as expected.

What happened? Two GCA operators were watching the same aircraft while talking to two different ones. We followed the instructions of our controller, but evidently he was watching the other aircraft, and we were both responding the same.

We discussed the incident with GCA and other pilots but dismissed it as only possible in a training environment. Everyone seemed convinced that under actual instrument conditions, radar contact would mean that no misunderstanding would be possible.

The bottom line seems to be "A sure thing never is."

Howard "Zeke" Ziemer
Rt. 1, Box 216

Re: One for the Falcon (Feb '88)

NAS Lemoore, Calif. — Congratulations on an excellent issue of Approach! At the end of the article on the save of an F-16 by Capt. James Trinka, USAF, you stated that "Navy and Marine Corps policy in similar situations is to eject." This is not 100 percent correct. While it is true that the OPNAV 3710.7 series prohibits simulated flameout approaches (SFOs), and states that flameout approaches shall not be attempted unless it is impossible or impracticable to abandon the aircraft, a waiver from the Naval Air Systems Command has been in effect for F-16N and TF-16N aircraft since June 1987. I was ASO at Strike Aircraft Test Directorate, Pax River, when the F-16N project officers, Maj. Troy Pennington and Lt. Jim Jones, made the request on behalf of all F-16N and TF-16N activities.

The F-16 aircraft was designed to perform emergency flameout approaches, and the USAF Flight Manual requires that SFOs be performed as part of numerous engine and fuel system emergency procedures. The F-16 is equipped with a jet fuel starter and hydrazine-fueled emergency power unit which, in combination, are capable of providing full electrical and hydraulic power for flight controls, landing gear, brakes, nosewheel steering, radios and flight instruments. The F-16 flameout approach capability has been demonstrated both in flight test and repeatedly in actual USAF service (over 20 saves to date). In addition, USAF pilots perform practice SFOs on a routine basis, and Navy and Marine Corps pilots who have undergone initial F-16 qualification have all flown practice SFOs in training. The waiver permits F-16 activities to maintain pilot proficiency by authorizing the SFO pattern.

LCdr. David M. Kennedy
VFA-125

Approach welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: Approach Editor, Naval Safety Center, NAS Norfolk, VA 23511-5796. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

Re: The Microburst and Naval Aviation (April '88)

Santa Ana, Calif. — I would like to applaud Approach on its weather issue. I am an active Reserve CH-46 pilot and had a question concerning Cdr. Joe Towers' article. He did a superb job in describing the microburst phenomenon and its effect on fixed-wing aircraft.

What unique aerodynamic characteristics would a helicopter encounter and what, if any, recovery procedures are recommended for rotary-wing pilots during microbursts? Unfortunately, CH-46s do not offer the advantages of HUDs and speed to avoid storms, but we do have the capability to land almost anywhere.

Capt. Peter White, USMCR
HMM 764, MAG 46
MCAS El Toro, Calif.

• The "unique aerodynamic characteristics" that might be expected of rotary-wing aircraft during a microburst encounter are moderate-to-severe turbulence and excessive roll rates. Such characteristics could render the aircraft uncontrollable regardless of any flight crew inputs. Other unique characteristics would be similar to flying into a tornado or hurricane, but on a smaller scale.

As for a rotary wing recovery technique, I would suggest some combination of forward velocity (to facilitate exiting the microburst) while maximizing upward vertical acceleration to counter or overcome the effects of flying in a descending, violent air mass with multiple vortices. Avoidance of terrain impact is the objective, unless you take a forced landing. More specific procedures or techniques should be incorporated into NATOPS for each aircraft via respective model managers. Inputs on how to best control flight path direction should come from experienced aviators in type — and that's you.

Recognition and avoidance of any potentially dangerous condition will always be far superior to any technique or procedure. When we confront the fury of nature, especially explosive-convective phenomena, there are no points for second place! — Cdr. Joseph F. Towers, USNR-R, VTU-9494, San Diego, Calif.

Okay,
once more.
"You can't
soar with eagles
if you stay
up all night
with the owls."
Got it?

Don't let the Song of Freedom ruin your hearing.

Wearing your attenuators is sound advice.

Poster idea contributed by ADAN Ratley, VAQ-130, CV-67.